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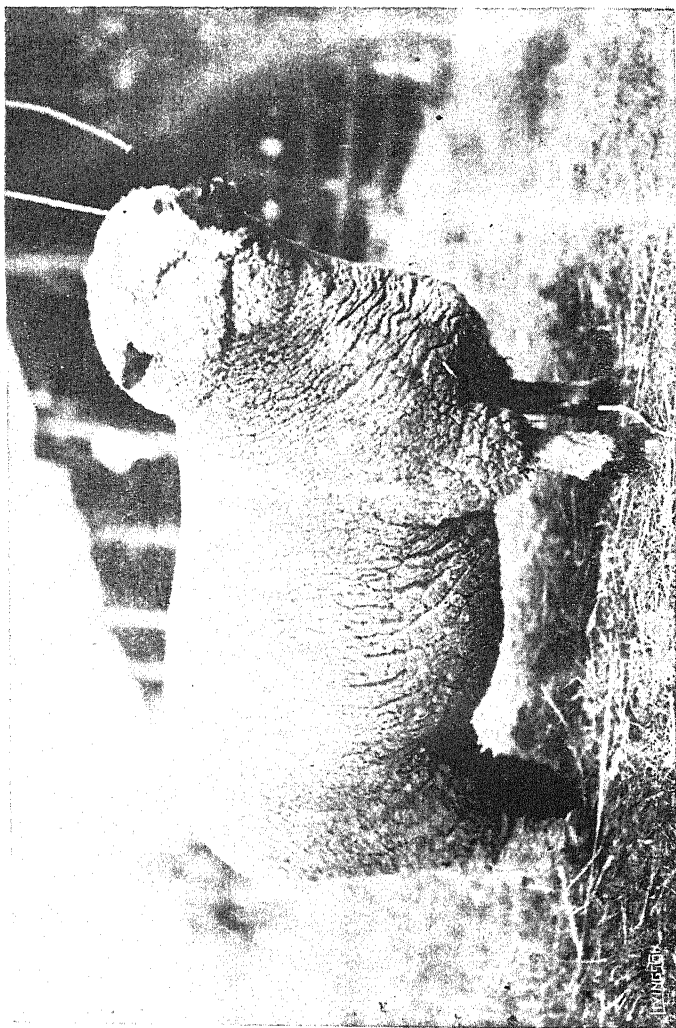
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AN AUSTRALIAN SHROPSHIRE.

The Natal Agricultural Journal.

The Maize Crop.

NOVEMBER and December saw the planting of the main maize crop of the 1908-9 season; and now the crop is well up and looking fairly healthy. Small areas were, as usual, planted as early as August and September, but the main sowings have as a rule been made at a much later date than ordinarily, in order to escape as far as possible the ravages of the mealie grub. This late sowing is a factor which must be borne in mind when considering the prospects of the crop, since it lessens, to a very great extent the possibility of a reduction of the crop from this cause, and it may be found almost to eliminate this adverse factor altogether.

In accordance with our custom, we propose to keep our readers advised as to the state of the crop; and this year we have reorganised to a considerable degree the system of crop-forecasting upon which we have worked hitherto, in order to reduce the chances of error to the smallest degree possible and also to give our readers a *monthly* revision of our first estimate. Last year a misunderstanding took place owing to many merchants having taken our first estimate as a final one and either overlooking or not considering the revised estimates which we published later in these pages. We shall publish a report on the state of the crop every month, and in each report we will revise the previous month's estimate where necessary.

We are enabled to prepare these estimates through the good offices of a number of prominent farmers whom we have approached and who have very kindly agreed to supply us with a report at the beginning of each month, on forms supplied by us, upon the state of the crop on the

last day of the month just ended. We wrote to a large number of farmers, but under 50 per cent. of them have agreed to help us; of the rest about ten per cent. have written to say that they would not be able, for various reasons, to help, while of the remainder we have up to the time of writing heard nothing. We trust that those who have not yet sent in reports, and who can possibly do so, will post the January and following schedules on the dates specified thereon, as the more reports we have the more reliable, naturally, must be our estimate.

From the reports we have received we find that the average increase for the whole Colony in the area of mealies planted this season is 16.2 per cent. The area cropped last season was approximately 143,000 acres, so that the total area under maize at the present time is in the vicinity of 166,000 acres. We give below, for the purposes of comparison, the areas for each of the five years 1904—1908, together with the estimate for 1909:—

1909	166,000 (Estimate)
1908	143,000 (Approximate)
1907	117,750
1906	112,486
1905	134,612
1904	131,190

In making this estimate we have carefully weighted the estimates sent in by our correspondents, according to the importance, from a mealie-growing point of view, of each Magisterial Division; and we have followed the same procedure in fixing the probable yield per acre. The yield per acre we have calculated upon the reports as to the condition of the crop on the 31st December, so that it must be remembered that what we have to state here does not refer to the condition of the crop at the time of writing but at the end of last month. According to our reports, then, we calculate that the prospects on the 31st December were for a crop giving an average of 4.7 muids to the acre for the whole Colony. Multiplying the estimated acreage by this figure we get a probable crop of 780,200, or, say, 780,000 muids.

So much for the statistical side. We may now proceed to examine the reports themselves upon which these calculations are based. We asked our correspondents to state, in their December report, (*a*) what the increase or decrease—as the case might be—in the area of land planted with mealies this season as compared with last was in their district, and (*b*) what the condition of the crop was on the 31st December, using the words “Poor,” “Fair,” “Average” or “Above the Average,” to describe it. In averaging up these reports we have used the figures 1, 2, 3, and 4, to represent the conditions “Poor,” “Fair,” “Average,” and “Above the Average,” respectively; and we have thus got the

following results which we publish here as they will probably be of general interest. We may first explain our method a little more clearly, however, taking as an example the condition of the crop in the Lower Umziakulu Division—2·7. The figure “2,” it will be remembered, represents the condition described as “Fair,” whilst “3” represents “Average” condition. Thus 2·7 will represent an *average* condition of from “Fair” to “Average,” but a little nearer “Average” than “Fair.” This does not mean, of course, that all the crops in that Division may be described as 2·7 in condition. In fact, it may easily be that not a single field is of such condition. The meaning is that, taking the crops as a *whole*, their condition is something a little more than midway between “fair” and “average.”

Our results, given for Magisterial Divisions, are as follows:—Lower Umziakulu, 2·7; Alexandra, 2·5; Unlazi, 3; Inanda and Indwedwe, 3; Lower Tugela and Mapumulo, 2; Impendhle, 3; Alfred, 3; Ixopo, 2·4; Richmond, 2·5; Umgeni, 3; New Hanover, 2; Lion’s River, 3; Umvoti, 3·7; Krantzkop, 3; Underberg, 4; Polela, 3; Bergville, 3; Estcourt, 2·7; Weenen, 3; Klip River, 2·8; Umsinga, 2; Dundee, 2; Newcastle, 3; Vryheid, 2·5; Babanango, 1·7; Eshowe and Mtunzini, 3; Emtonjaneni, 2; Nkandhla and Nqutu, 2.

Weighting these averages in the way we have indicated, we find that the average condition of the mealie crop of the Colony on the 31st December was 2·7, or between “fair” and “average.” In estimating the yield per acre, we have taken the actual average yield for the whole Colony for the past five years—1904-1908—which works out at 5·16 muids per acre. This we should have taken as the probable yield of the present season’s crop had our reports as to condition worked out at “Average,” or 3. As it happens, however, they have come out at 2·7, which, by proportion, gives us an average yield of 4·7 muids.

As we have said before, these results—except, of course, as regards acreage—hold good only until the appearance of our next issue, when they will be revised in the light of later reports.

In this article we refer only to crops by European farmers. We have received no reports regarding natives’ crops, save in a few isolated cases; but if we are in a position to collect information before harvesting takes place we will do so, as the extent of the natives’ crops must always, as we have on several occasions previously pointed out, have an important influence upon the export trade. Failure of the natives’ crops means so much of the European crop withdrawn from the possibility of export oversea, since the natives are large purchasers from the European farmers; and it is necessary for us to have some idea as to the extent to which the natives will be purchasers in order that stocks may be held in the country sufficient for the Colony’s requirements until the new crop comes on to the market.

Volume Twelve.

WITH this issue we open a new volume—Volume XII.—of the *Journal*. In the past our policy has always been to endeavour to increase the attractiveness and usefulness of the *Journal*—and how far we have succeeded in this direction it is for our readers to say;—and in the future we shall at all times continue to carry out that policy, so far as our resources will allow. With this issue we introduce several fresh features into the *Journal*—the first of a number which we contemplate introducing this year. The first of these, which will have already struck the reader, is our “MARKET SUPPLEMENT.” Our reasons for thus printing our market news separately from the *Journal* itself are several, but the most important is that we shall thereby be in a position to present our readers with market information of a much later date than we have hitherto found it possible to do. Readers will readily understand that with a journal of the size of the *Natal Agricultural Journal* some time must elapse between the handing to the printers of the last batch of “copy” and the delivery of the bound and cut journal to the reader, so that market news which is printed in the *Journal* itself must necessarily be somewhat out of date by the time it reaches the reader’s hands. By the arrangements we have made, however, we shall now be able to let our readers have the latest *available* information. We have put “available” in italics: it often happens that reports from markets outside of Natal miscarry or are not posted in time, and the information which we are compelled to print is not the latest we might have had, although it is the latest *available*. In the MARKET SUPPLEMENT we shall print all news relating to the markets, both South African and oversea, as well as sundry information, statistical and otherwise, relating to crops in this country and elsewhere, in order that it may be as useful a publication as possible for the farmer, the merchant, or the buyer of farm produce, who wishes to be kept informed as to the state of the markets. We shall at all times welcome any suggestions from our readers for the improvement of the SUPPLEMENT, as no one recognises more fully than we do the necessity to the farmer of up-to-date, reliable, and comprehensive information relating to the markets, upon which he is dependent for the sale of his produce.

In our last issue we announced the inauguration of the COMMERCIAL INTELLIGENCE BUREAU, which has been instituted under the charge of the Editor of the *Natal Agricultural Journal* by direction of the Minister of Agriculture. As this Bureau has for its chief object the marketing of goods, we intend publishing all notices and announcements

in connection with it, in the MARKET SUPPLEMENT; and we strongly advise readers to keep an eye on all Bureau notices as they appear each month.

Another feature which we have introduced with this issue is three pages of short paragraphs of interest to farmers by recognised experts in agriculture and the allied sciences, which will appear monthly under the heading of "SCIENCE AND THE FARMER." In selecting these paragraphs we have paid due regard to simplicity and pithiness of expression; and we think that farmers will find much of value in these notes.

Still another feature which is inaugurated with the present issue is a statement showing the position of East Coast Fever, compiled under the direction of the Chief of the Veterinary Division (Mr. W. M. Power). A similar statement will appear in each issue in future, showing the locality of the outbreaks of the disease which have occurred during the previous month, and we venture to think our readers will appreciate this innovation.

A further new feature, to which we give more extended reference in our "Notes and Comments" in this issue, is the establishment of a FARM APPRENTICES' BUREAU, which has for its object the drafting of boys from the towns to the farms to serve as apprentices to farmers, learn farming, and thus qualify themselves to take up land in the Colony later on if they so wish. Many farmers would be glad to have European boys on their farms; and accordingly we are opening a register of boys who desire to get on to farms and of farmers who would be willing to take boys. A list of applicants (numbered) will appear in each issue. We refer readers to the more extended reference to this matter which will be found under "Notes and Comments."

These are just a few of the new features which we contemplate introducing during the present year. Our older features remain: the "Exchange Reviews," the object of which is to keep farmers informed as to what is going on in the agricultural world, except such matters are specially referred to elsewhere in the *Journal*; the "Among the Farmers" section, devoted to the monthly doings of the various agricultural societies and farmers' associations; the monthly article on the agricultural conditions prevailing in the Colony; and the various older features of the *Journal*.

We shall endeavour always to enhance in all ways the value of the *Journal* to the farmer and to increase its attractiveness; and we shall at all times be glad to receive and consider suggestions for its improvement. We may here add that we are always pleased to have articles from practical farmers; we have published several during the past year, and we have been promised further ones at an early date. We hope that others also of our readers will be able to help us during the coming year, as such articles add greatly to the practical value of the *Journal*.



The Value of Tillage.

Some interesting cultivation experiments have been carried out during the last two years at the Robertson Experiment Station, Cape Colony, with oats, barley, and wheat. Surprising results have been obtained: in fact the increases gained from additional cultivation were so remarkable the first season that it was thought that perhaps the cause might be in the land itself, so the plots were reversed this last season, and those that gave the heaviest returns the previous season, instead of being thoroughly worked and reduced to the best mechanical condition possible, only received the usual cultivation, and, true to the previous year's experiment, gave the smallest yield, whereas those that gave the small yields last season under the usual methods of cultivation have this season given the maximum returns under increased cultivation. This proves conclusively that the increase was not due to difference in the soil of the various plots, but to the increased cultivation.

Mr. R. W. Thornton, the Government Agriculturist, gives the results and conclusions drawn therefrom—of the experiments in a brief article in the *Cape Agricultural Journal* for January. Last season the experiment was carried out on the following lines:—The land was uniformly dressed with a complete fertiliser. Each plot received the same quantity of water, including rainfall. After ploughing a cultivator was run over the land, and the seed (oats) sown with the Superior Seed Drill, and the experimental area was then finally rolled. Each successive plot, however, received one more ploughing than the previous one, and the yields are in steadily ascending order. The cost of each ploughing after the first is taken at 6s. per acre and the forage at 2s. 6d. per hundred pounds. The results were as follow:—*Plot No. 1*, receiving one ploughing, yielded 750 lbs. of oathay per acre. *Plot No. 2*, receiving two ploughings, yielded 1,000 lbs. of oathay per acre; the value of the extra oathay obtained (250 lbs.) was 6s. 3d.; the cost of the additional ploughing was 6s.; so that the clear profit over one ploughing was 3d. *Plot No. 3* received three

ploughings; it yielded 1,880 lbs., or 1,130 lbs. more than Plot No. 1, the excess being worth 28s. 3d.; the cost of the extra ploughing was 12s.; so that in this case a clear profit was obtained of 16s. 3d. over the results of one ploughing. *Plot No. 4*, receiving four ploughings, yielded 3,800 lbs. of oathay per acre, this was 3,050 lbs. more than that obtained from Plot No. 1, the additional oathay being valued at 76s. 3d.; the cost of the additional ploughing was 18s., so that a clear profit of 58s. 3d. was obtained. Equally striking results were obtained from the barley and wheat plots planted during the past year. In these experiments, however, the plots were each ploughed and harrowed once only but were cultivated each once more than the previous one.

The results of these experiments emphasise the importance of careful tillage, and show that, although manuring is highly important, yields can be still further and profitably increased by extra ploughing or cultivating. In India, where the peasants often find it difficult to obtain fertilisers and labour is cheap, they depend largely on obtaining good crops by increased cultivation, and will frequently plough their land four or five times. Four ploughings appear to be the most tried at the Robertson Experiment Farm, and it is probable that ploughing much more frequently than this would not have any better effect than four or five times ploughing.

Root Crops in Great Britain.

We have received from the British Board of Agriculture and Fisheries a copy of a preliminary statement which they have issued showing the estimated total produce and yield per acre of the potato and root crops in Great Britain in the year 1908, with comparisons for 1907, and the average yield per acre of the ten years 1898-1907. The potato crop of 1908 amounted to 3,919,798 tons, as compared with 2,977,485 tons in 1907; and the average yield per acre during these two years was 6.97 tons and 5.42 tons respectively. Of turnips and swedes, 23,738,207 tons were produced last year, which again is an increase over the quantity produced in 1907—22,085,718 tons. The yield was 15.31 tons per acre in 1908, as compared with 14.13 tons in 1907. Mangolds also show an increase—8,987,161 tons in 1908, and 8,936,922 tons in 1907;—and the yield per acre as well was above that of the previous season: 21.01 tons in 1908 and 19.86 tons in 1907. The season appears to have been a good one for all root crops, as in each case the average yield per acre is above the average of 1907 and considerably higher than the average of the ten years 1898-1907. The acreage of potatoes was greater in 1908 than in 1907, but in the cases of turnips and swedes, and mangolds, the area was lower than that of the previous season, although heavier crops were obtained.

"Chou Moellier."

We referred in our last issue to a new fodder plant—"Chou Moellier"—which is coming to notice in Victoria, and we have now received an enquiry from a reader asking for some seed if any is available. If any of our readers should happen to know whether seed is obtainable in Natal, and where, we would be glad if they would communicate with us. In the meantime we are writing to the Victorian Department of Agriculture on the subject and asking to be given the names of any seedsmen in Melbourne or elsewhere from whom seed of this fodder plant might be obtained.

Recent E.G.F. Regulations.

The Minister of Agriculture has prohibited, by Government Notice No. 735, 1908, the removal of hides, horns, hoofs, hair, and heads of cattle, cut grass, manure, litter from places where cattle are kept, lucerne or any other fodder, from, into, or within any infected area, except upon permit obtained from the Advisory Committee or Committees concerned. Permits for the removal of hides, horns, hoofs, hair, and heads of cattle, cut grass, manure, litter from places where cattle are kept, lucerne or any other fodder by rail from any railway station must be obtained from the Minister of Agriculture, and will be issued subject to such conditions as he may see fit to impose.

With reference to the Order of the Minister of Agriculture, published under Government Notice No. 671 of 1908, prohibiting the acquisition of cattle by purchase or otherwise without a permit from the Minister, a further Government Notice (No. 722, 1908), notifies that the Order shall be limited to the purchase of cattle for slaughter or to their purchase or acquisition otherwise in the course of trade. "It must be understood," the Notice concludes, "by persons acquiring cattle for other purposes that the present Notice in no way exempts them from the obligation of obtaining permits for the removal of any cattle which they may acquire."

By Government Notice No. 734, 1908, the Minister of Agriculture has declared that the farms "The Oaks," "The Elms," "Glastonbury," and "Snipemmarsh," in the Klip River Division, shall, for the purpose of the East Coast Fever Acts, be deemed to be a portion of the Magisterial Division of Newcastle, and all restrictions or regulations which now or hereafter may be in force in the Magisterial Division of Newcastle will, in like manner, be in force as regards the said farms. Another Notice (No. 29, 1909) cancels Government Notice No. 670, 1908, by which the Minister ordered that all cattle in Sub-division No. 2 of the Magisterial Division of Estcourt should be branded with the District brand.

Oxfords, Leicesters and Southdowns.

A correspondent writes asking to be supplied with the names and addresses of sheep breeders in Natal breeding Oxfords, Leicesters and Southdowns. We shall be glad if readers who may be breeders of these sheep will kindly communicate with us.

Export of Angora Goats.

Legislation having been enacted in the Territories of Swaziland, Basutoland, and the Bechuanaland Protectorate, prohibiting, under penalties equal to the penalties imposed under Act No. 29, 1908, the exportation of Angora rams and ewes, the exportation of rams and ewes from Natal to those territories is henceforth permitted. Readers will doubtless remember that, under Act No. 29 of 1908, the export of Angora goats is prohibited, under penalty, except to such States and Territories in South Africa as have passed similar legislation imposing a like penalty.

Domesticating the Eland.

In connection with our note in the November issue of the *Journal* on the domestication of the eland for use on farms, we have received some interesting particulars regarding the capture and domestication of the young animals by the Forester in charge of the Giant's Castle Game Reserve (Mr. R. E. Symons). During the past few months the Department of Agriculture has been experimenting in connection with the capture of eland calves, with a view to demonstrating to what extent the domestication of these animals is possible; and during the months of August and September, 1908, the capture of 18 calves and 3 yearlings at the Game Reserve was effected for this purpose.

The method of capture adopted by the Forester in charge of the Reserve was to pursue the cow and young on horseback, eventually separating them and riding down the young until exhausted. The chase, before capture is effected, extends sometimes from eight to ten miles. The young elands, when caught, are strapped on the front of the saddle, and in this manner are conveyed to the homestead at the Reserve. It is necessary in some cases during the ride after capture to release the calves several times in order to rub their legs, which become thin and the circulation impeded, owing to the method of transport from place of capture to destination. It can easily be understood that good horses as well as good riders are required to carry out this operation effectively. Experience teaches that it is inadvisable to capture yearlings, as they usually die from the effects of confinement. One was kept alive for two or three weeks, but the other yearlings died. The calves are very docile and become tame in a few days; they never sulk, and take readily to their food

(usually diluted milk as a start), and quickly become accustomed to a calf feeder. Gallsickness would appear to be a disease to which these animals are subject. Bad luck was experienced with the calves in this connection, and three succumbed to the disease. On removal from the Reserve to Cedara no trouble was experienced in driving the calves from place to place. A certain demand for these animals appears to exist, the Director of Agriculture and Forestry having received several orders for young calves.

Fishing Restrictions.

Under the provisions of Law 21, 1890, fishing has been prohibited from the 15th January, 1909, until the 31st December, 1910, in that portion of the Umtamvuna River between the Falls and the junction of the tributary stream Ludeka, and in the following tributary streams from their source to their junction with the Umtamvuna River, viz: The Upata, the Lidabeka, the Liweza, and the Mwaca. This restriction has been made on account of the fact that trout have recently been introduced into the Umtamvuna.

Orders have been issued, also, affecting Coast fisheries. One of these Orders ordains that, during the period from the 1st January to the 31st December, 1909, it shall be unlawful to capture or attempt to capture by any means whatever shrimps, prawns, crabs, or crayfish in any canal, river or stream opening or running into the Bay of Natal. The other Order declares a further close season for mussels in Colonial waters between the Tugela and Umtamvuna Rivers.

Nottingham Road Horse Fairs.

In our Correspondence pages in this issue will be found a letter from Mr. William Wood, who writes on behalf of the Horse Fair Sub-Committee of the Nottingham Road Farmers' Association, regarding the horse fair held at Nottingham Road in November. This letter was received too late for insertion in our December issue, and so appears somewhat belated. It will, however, serve its purpose, which is to draw the attention of farmers to the horse fairs which the Nottingham Road Association, with very commendable enterprise, proposes to hold every six months. Mr. Wood's report of the first of these fairs shows excellent results and gives promise of some very successful fairs in the future. At the sale, as will be seen, hacks realised up to 30 guineas, carriage pairs in harness up to 59 guineas, draught pairs in harness up to 50 guineas, and entries up to 30 guineas; and altogether horses to the value of £1,200 changed hands. These results are encouraging and promise well for the future. The idea of holding these fairs is a very good one, and we hope it will receive the practical support it deserves.

A Farm Apprentices' Bureau.

By direction of the Minister of Agriculture (the Hon. W. A. Deane) we are now organising a "Farm Apprentices' Bureau" for the purpose of putting European boys in the towns in touch with farmers who are willing to take apprentices on their farms. Mr. Deane has been struck by the number of boys in Maritzburg and Durban who appear to be "unemployed" and who are to be seen wandering aimlessly about the streets. These lads he considers would be well employed on farms, since there are doubtless many farmers who would be willing to take such boys as apprentices. We are accordingly opening lists of (a) boys desirous of serving an apprenticeship, and (b) farmers who would be prepared to take boys as apprentices. We hope to reach the boys through the columns of the daily press; and in the meantime we shall be glad to receive the names and addresses of farmers who can give employment to youths. Farmers should state (a) age of boy desired, and (b) terms of employment. All communications should be addressed to the Editor of the *Natal Agricultural Journal*, Maritzburg.

Scientific "Water Finding."

New inventions are so frequent that we are commencing to regard them almost with indifference—or at least with very little interest. What was once regarded as marvellous is now commonplace, and present-day inventions have little effect upon the modern mind satiated with "novelties" and "wonders." But we are still able to feel wonder at a particularly "marvellous" invention or contrivance, and we realised this on looking through a prospectus which we have lately received of a "Patent Automatic Water Finder." We are all acquainted with, or have heard of, the mystic "dowser" with his prong, who claims to be able to detect the existence of subterranean waters and sometimes to indicate the approximate depth at which the water will be found. But our friend is destined soon to be relegated to a place among the sometime wonders of a past age, if the prospectus before us is not too optimistic. The Finder, we read, "is a simple apparatus by which any unskilled person may readily ascertain whether a subterranean spring of pure water exists under a spot where boring operations are desired," for it "indicates the presence of subterranean flowing springs at depths up to 1,000 feet." Such an instrument should prove a great boon to farmers in South Africa, and it will accordingly be of interest to note the claims made for it

The principle on which the instrument works, we learn, is the measuring of the strength of the electrical currents which are constantly flowing between earth and atmosphere, and which are always strongest in the vicinity of subterranean water courses, the flowing

waters of which are charged with electricity to a certain degree. "Should a subterranean spring be present under where the instrument has been fixed, the needle commences to move; note being carefully taken of the number of degrees on the scale, and the position of the instrument changed from time to time, the spot where the greatest movement of the needle has been obtained is that where the well boring should be made. If the needle remains stationary, it may be taken for granted that a subterranean spring does not exist under the spot where the instrument is fixed. . . . Observations should always be taken between 8 and 12 in the morning and 2 and 5 in the afternoon, these being the hours of greatest activity of the vertical air currents. A fine, calm, clear day should be selected, as the instrument does not work so well when earth and atmosphere are saturated with moisture. The instrument does not work under trees or in the immediate vicinity of iron structures. The instrument indicates water courses flowing underground in a natural state, and not water pipes or courses that have sprung up to day-light."

The instrument is stated to have been thoroughly investigated by leading scientists and engineers, who have given their professional opinions and vouch for the successful application of the invention. The instruments are made by Messrs. W. Mansfield & Co., of Liverpool, in two sizes, the £100 one for locating subterranean streams at depths up to 1,000 feet, and the £50 one at depths up to 500 feet. These prices include packing and delivery f.o.b. steamer, London or Liverpool. The instrument will appeal to those who are interested in "Water Finding," and who can appreciate the importance of having the knowledge before commencing costly boring operations, whether a good spring of water will be found or not within reasonable limits.

Mule Breeding.

The spread of East Coast Fever, with the accompanying restrictions upon transport, has turned men's minds to the mule, the donkey, and the horse as draught animals, and wagons drawn by spans of mules or donkeys are the rule rather than the exception as they used to be in the old days. The continuance of East Coast Fever is, therefore, likely to render mule-breeding a profitable business for any enterprising farmer who cares to undertake it on a large scale; and at the same time there are doubtless numbers of other farmers who may feel disposed to breed mules at a side-line, dispose of the animals they do not want when the market happens to need them and use the others on their own farms.

Mr. Alex. Crawford read an interesting paper on Mule-Breeding at the recent Agricultural Conference of West Australia, in which he gives

some useful facts that farmers thinking of going in for mule-breeding in this country should find of value. The finest jackass, he remarks, is in Spain, where there are many varieties of asses; and the most prolific province is Catalonia. "The Catalonian," he continues, "does not possess the size, but has quality, spirit, and style. Next comes the Poiteau donkey. He is larger, and rough-coated, of inferior spirit, and not such a good mule-getter. To breed mules commercially the essential is a good donkey sire. The United States possesses from 6,000 to 7,000 donkeys, entered in the Stud Book; they are worth from £30 or £40 up to 400 or 500 guineas apiece. Everything depends on the size of the jack. A jack from 12 to 13 hands is worth £20 to £30, of 16 hands up to 400 or 500 guineas. But for ordinary purposes, for heavy draught work, the jack should be 15·2 to 16 hands. For lighter saddle and harness work jacks may be anything from 14 to 15·2 hands.

"The main qualities to look for in a jack are size, bone, and weight. The frame should be high and compact. A light-framed and light-boned jack will beget an inferior mule. The weight should not be less than 1,100 lbs. for draught purposes. In buying a jack for breeding purposes a guarantee should be obtained that he will cover mares, as many people here have introduced jacks at heavy cost to afterwards find they would not cover mares at all. Jacks permitted to cover female donkeys have often refused to have anything to do with mares. In one case a jack costing £350 was imported to South Australia eight or nine years ago, but begat no mules. It is useless to put a high-class jack to an inferior mare, as so much depends on her. In countries where mules are bred largely the best mares are sold for mating, and the finest mules are from mares that have a large proportion of the Persian Pecheran breed. To all intents and purposes they resemble the Suffolk in everything except colour. The finest mules bred in America and Europe are generally from well-bred mares of this stamp. It is not unusual there to see mules 16 to 17 hands high worth £80 to £100. Well-bred mares should be used for buggy and riding work."

A New Cane-Cutting Machine.

For several years inventors have been at work with the object of producing a machine which will not only cut, but also top, the sugarcane. None have hitherto been successful. Whatever machine has been, or may be, invented for the purpose, it is certain that none will ever work satisfactorily on rough stony land, where, in many cases, the finest cane is grown. According to the *Queensland Agricultural Journal* another inventor has entered the field—Mr. W. J. Howcroft, of South Brisbane, who has invented a machine in which, he claims, he has overcome all the difficulties which previous inventors have been unable

to cope with. We learn that the invention, which is at present financed by a local syndicate, has been patented in all sugar-growing countries, as well as in Great Britain.

Mr. Howcroft supplies the following information regarding his invention:—Like an ordinary harvester, the machine runs outside the cane, and the motor power sets in action a series of blades, which are aptly termed “feelers” or “fingers,” which, when not in use, can be raised to a height of 18 in. above the ground. When working, these “fingers” are lowered, and seize the cane in the same manner as would be done by a man when cutting. Beneath them are cutting knives, rotating on a lever at high speed—some 400 revolutions per minute. These are so arranged that they can cut the cane an inch or more below the surface of the ground, a most important point, as all sugar-growers know. As soon as the canes are cut, they pass on a movable platform to a man who watches till the canes reach the point at which they would be topped by the human cane-cutter. Then the topping knives, which revolve at the same speed as the cutters, top each cane at the right point, after which they are delivered on the ground by means of a trough. The tops themselves are passed out separately. The machine is worked by means of two small oil motors.

Should this machine fulfil its inventor's expectations, the cost of cane-cutting will be so reduced—amounting, it is claimed, to a saving of five-sixths of the present cost—that cane-growers will, as the *Queensland Agricultural Journal* points out, reap an enormous benefit. The machine is expected to cut 150 tons of cane a day, which would mean that a 30-ton crop on 50 acres would be harvested in 10 days. The rapid work, if it be accomplished, will be of incalculable benefit to growers and mill-owners where cane has been heavily frosted, as occurred this year. Thousands of tons of cane could have been saved which became either a partial or total loss, owing to the impossibility of getting the frosted cane off in time, seeing that, at the most, smart cane-cutters can only cut about 3 tons a day, even when working—as many cutters do—as long as 10 and 12 hours a day. In 1907, 94,384 acres of cane were crushed out of a total area planted of 126,810 acres. The weight of cane crushed was 1,665,028 tons.

Lambs for Export.

In connection with the articles in our last issue on the subject of mutton-production, some remarks by Mr. H. W. Ham, Sheep Expert of the West Australian Department of Agriculture, on the causes of rejects of lambs forwarded by farmers for export, are of interest. Farmers in the lamb-raising industry are sometimes disappointed

with the average price paid and the number of rejects made by export buyers each year. Some farmers and buyers too, hold that these rejects will do again for lamb raising. If the rejection is on account of want of condition, owing to the season or bad feeding, it may be so, but if carelessly bred in the first place then they can never possibly be good lamb raisers. "It is only too plain, however," Mr. Ham remarks, "that when our lambs are at their prime and in greatest numbers there are not sufficient works or cool storage to promptly deal with and hold them. Farmers are then told that the lambs are not ready, and have to wait until their lambs are past their best in sappiness and quality. At the same time it has to be admitted that with many farmers the fault lies with the breeding of the lambs more than with the man rejecting them.

"Too many farmers," Mr. Ham points out, "breed second quality. Many more spoil their lambs in the feeding. What they term 'stocking up' is responsible for much of this, sometimes in tricky seasons through no fault of the farmer, but mostly in good seasons when the temptation of luxuriant herbage is great. Others give the animals no chance by forcing ewes and lambs to clean out cultivation and fallow paddocks. This condition of things will always exist to a greater or less extent; all have to learn by experience, and for those who believe in what they call 'a little dealing' the danger of being caught is always present. A matter, which up to the present many farmers have not given sufficient thought to, is the secondary result obtained by mating certain breeds and grades of ewes with rams of such a class that the result cannot be satisfactory. Thick-set sappy lambs stand knocking about in trucks and yards with a minimum of damage. Lambs when full of grass may look well in the paddock, but often the dressed carcass shows very little thickness through the fore-quarter. Lambs of this kind quickly lose whatever little bloom they may have had when they left the paddocks. Small merino ewes, especially if the fleece is marked by extreme density and head covering, are best mated to the smaller boned, neater headed and bare pointed Leicesters. The latter should, however, be shapely and well woolled, and not some of the thin locked and wasty fleeced sorts that are too common in the country. This useful breed is at present undergoing a mild boom.

"Our best thriving breeds are the Downs and the best fleeced of these are the Shropshires. But when joined with merino ewes, especially the station culls that the farmer too often gets hold of, these lambs are only second rate freezers at best, for merino ewes are not the best of milk givers. They are also the worst of wool cutters if held over, as a lot of them have to be. The Shropshire is only a fair woolled breed, and

these ewes are culled for being either inferior or light woolled. No class of sheep is less profitable than cull merinos, for they are culled for ill shapes as well as for poor fleeces, and this means ill doers and bad milkers. The lambs cannot inherit any useful wool-cutting qualities, and have only the sire to give better constitutional shape, but this is counteracted by the dam being a poor doer, and consequently a poor milker. After all, the ewe has to carry the lamb and then rear it, and as regards freezing lambs, the ewes have more to do with the success of them from start to finish than the ram. One starts it, the other finishes it. Good sorts of well-grown merino ewes should go to thick-set, good-fleeced Lincoln rams. Good sorts of coarse Lincoln-merino ewes should go to good shaped Downs rams for farmers raising export lambs, and to level made plain bodied merino rams for wool-growers. . . . All the natural advantages and best of feed will not make prime quality lambs, unless they are reared from roomy, good-shaped ewes and begot by level made rams of a breed suited to correct whatever faults the ewes are inclined to."

Lungsickness.

Outbreaks of Lungsickness have occurred lately in the Magisterial Divisions of Estcourt, Bergville, Alfred and Lower Umzimkulu, and repressive measures have been taken in the direction of the declaration of infected areas within the meaning of the Lungsickness Prevention Act of 1897 and the prohibition of the movement of cattle from those areas. Bergville and Estcourt are dealt with by Proclamations Nos. 77 of 1908 and 9 of 1909, respectively. In the former Division the farm "Riet Vallei," and in the latter Division the farms "Calcote" and "Scottsfontein," have been declared infected areas, and the removal of cattle from these farms has been prohibited. The Magisterial Division of Alfred and Lower Umzimkulu were dealt with by Proclamations published on the 29th December, but a further Proclamation has since been issued modifying the restrictions then imposed. Cattle which have been inoculated against Lungsickness to the satisfaction of the Veterinary Officer in charge of the district may now be moved along any main road through any of the infected areas previously defined by the Proclamations in question, provided that the permit for such removal as required by the East Coast Fever regulations is first obtained.

Capital is *circulating* or *fixed*. On a farm, food, fuel, and stock are circulating, whilst bridges, roads, fences, and so on, are fixed.

From Kernel to Crib.

A CHAT ABOUT MEALIES AND MEALIE CULTIVATION.

ALL over the Colony now are to be seen large fields covered with young, green, graceful-looking mealies. Here the stand is good; there it is poor, but on the whole the young plants look well. Those fields represent an influx of fresh money into the country during 1909 to the extent of between £250,000 and £300,000—possibly more—if we have a good season.

Seventeen per cent. more land has been put under mealies this year as compared with the acreage of last year, and the crop is looking well: this means, with a normal season, a good harvest which will be considerably above that of last season.

Indirectly this shows greatly increased interest in maize cultivation. Farmers are beginning to recognise that there is money in "the miserable mealie"; and they are not only planting more land but they are manuring more and giving more attention to methods of cultivation with a view to increasing their yield per acre. In studying methods of cultivation of maize America has a special interest for us, for the United States are, practically speaking, the home of the mealie, with an annual production of over 800,000,000 muids. Maize is one of the most important crops of that country, and more study has been devoted to its cultivation there than in any other part of the world.

For the past ten years Messrs. Doerr & Sons, of Harvel, Illinois—in the very heart of the maize belt of that State—have made the breeding of corn a special study; and Mr. A. T. Doerr, of that firm, has written an article in the *American Thresherman*, on the cultivation and also the breeding of mealies, which contains some very interesting information that should prove useful and instructive to Natal farmers interested in mealie growing. Mr. Doerr has chosen the title which we have used for the present article—"From the Kernel to the Crib"—and he takes his reader right through all the stages in the life of a mealie, from the kernel (giving an account of its structure) to harvesting and the management of special plots for breeding purposes. In this article we give our readers an opportunity of hearing all he has to say; but at the outset he tells us that "this is not all 'book-farming' by a good deal. I am a farmer," he says, "and grew to manhood between the plough handles, and many of the things I will write about in this article have been studied out and tested on my own farm. I devote most of my time to corn growing and corn breeding, and I am never better satisfied than when I am engaged in corn improvement." "Corn," our readers may know, is an

abbreviation of "Indian corn," and is the American equivalent of our "mealies" or "maize."

I will commence, Mr. Doerr says, with the physical structure of the kernel, which is gluten starch germ, and the hull, or rain coat. This hull is very neatly arranged in three layers and contains rubber and glue. It is there to protect the germ, which in reality consists of three separate parts—embryo, root and the embryo stem. Both are fastened in the centre to the germ proper. You can see this with the naked eye, if you will soak a kernel in warm water for a few hours and remove the hull from the germ. This is the most delicate part of the kernel and has been protected by a tip cap, also on the bottom or point of the kernel, to keep out the wet, as well as by the rain coat, and so long as the kernel is held fast on the cob by this cap it will resist quite a lot of moisture, but when broken off the cob and put in moist ground, this is the mouth by which it drinks in water to start germination and the embryo root awakens out of its sleep and begins to feel for food. First it is supported on the milk of the germ and then the starch and gluten are eaten up; by this time the root has taken hold of the earth and the stem has pushed out into sunshine and is commencing to unfold its wonderful pack of living beauties. No peddler stopped at your door with more wonders than can be seen in this tiny stem coming through the ground like a pegging awl.

We were just looking at the embryo stem that had pushed its tiny form into sunshine, and I want you to go with me to the field again where the tiny visitor is. It did not come up by chance, but was planted by some human hand that had studied its ancestry, calculated its ability of reproduction, and estimated its value from a market standpoint. A thousand-fold is none too high, as every good kernel of corn has the power of producing one thousand kernels like itself. Am I overdrawing the picture? No; there is such a value hidden in this little stem. I certainly have not overdrawn its value. I simply call your attention to it at the beginning so we may have this picture before us—a picture of its high value, a subject worthy of our best thoughts, of our most earnest efforts, of our most careful attention—first in preparing for this plant, as if doesn't come by chance, neither will it yield its best results by chance, as its enemies are many, and its chances few without help, as these enemies are determined to make the corn grower put on his thinking cap.

But here we are again at the plant. I see you have made a good selection of the field. It appears to be a piece of clover sod. Yes. Fall plowed or did not plow it this spring? I fall plowed it. Well, that was a good job, for if the clover made a good growth last season and there were plenty of bacteria (nitrogen gatherers) on the roots, it has stored a large quantity of nitrogen in the soil. It makes more humus if turned

under green, but it also uses up more water and the ground lies too loose (in a dry season) for fibre and hair roots. We will notice them later. I therefore believe in pasturing clover in the fall with sheep, if possible, till October 15th, and then plowing six or seven inches deep, according to the soil. If the soil is light soil, five inches is plenty deep enough. You appear to have worked up a good seed bed here. How did you do it? First with the spading harrow or disc, then with a smoothing harrow.

How long was it in clover? Two years. Has the land had a regular rotation? Yes. Has it had any manure? Yes. Has it been pastured each fall and winter with sheep and cattle, also horses? Yes. Well, this is a most excellent piece of land, and I do not fear much trouble from insects, such as wire worms, cut worms, corn root worms or the corn root louse. Fall plowing, if done late, destroys many of these. All of these are very numerous and troublesome where crop rotation is not practiced, and in some localities not more than from twenty to thirty bushels of corn can be produced because the rotation of crops, pasture and manure have been neglected. We must bear in mind continually that we are farmers. The land depends on us for proper rotation and tillage, and it will yield in proportion as we drain with open ditch and tile.

Cultivate, rotate, manure and fertilize with manure, phosphate, rock limestone, ground and bone meal. Use no acids of any kind; they only stimulate and leave the ground poorer. All of these are necessary and depend on you and me. If we expect best results from our fields, we must use our best judgment; in short, we must farm better, and we shall reap more and better grain.

We will examine the cultivation and study the growth of the corn plant.

We have prepared an excellent seed bed on fall plowed land and have the corn plant peeping through the ground. Now we want to take the best care of it we can and make all we can out of it. I have always been a friend to the harrow and small corn, but you must not harrow the corn too young. When the leaves begin to unroll and when there are two or three blades you can commence, but wait till the sun is up a little, so it is reasonably dry. Yes, the harrow will cut out a stalk once in a while, but very seldom will it take more than one plant out of a hill, and that sometimes is a benefit instead of harm. Usually we get our corn too thick; this is oftener the case than too thin. So don't be afraid to harrow your corn a couple of times before you start the cultivator, and, if you do, it only cultivates the better.

Now the first cultivating, how shall it be? That depends on the work done before. If you have prepared a good deep seed bed and have harrowed twice and the corn and season are dry, you don't need to cultivate so deep, but as close as you can without harm. If your corn is

checked you will cross it a second time, and if you are not careful you will get closer this time than you did the first, because the hills are apt to be zigzag from the check rower, causing you to get closer on each alternate pairs of rows, first on the right and then on the left. This damage is not so great as is estimated. Sometimes these fibre roots, when broken off, at once go to work and send out a bunch of roots from the broken root and thus repair the damage very quickly and very substantially, and at the same time the plant is ready and equipped with another set or whorl of roots. These come under the surface while the plant is small. Two or three, sometimes four, of these whorls come to assist the plant. By the time we go over the corn the third time it is usually about knee high and then it begins to joint, we say. In other words, it assumes the nature of a stalk and at each of these lower joints you will find a circle around the stalk with little buttons or buds. These in a very short time develop into long touch roots (brace roots) and under favourable circumstances go down and anchor the stalk with such firmness as to protect it from the wind and storm. Now this brace root, as soon as it penetrates the ground, sends out thousands of fine roots and on these fine roots is found the hair rootlet. This is invisible to the naked eye, but you can see what looks like a mould. The work of these hair roots is to find food for the plant, and at this time it is pushing forward at such a rapid gait that we can notice the change each day, in a good healthy field of corn. At this time the leaves begin to lengthen and widen out, and begin to drink out of the atmosphere enormous quantities of water and feed the stalk as well as the roots. Prof. Holden says that ninety per cent. of the food is taken in through the leaves. If this be true we ought to be careful of the leaves as well as the roots. But the leaves and roots are only part of the machinery, or the working force, that is required to build up the stalk. The stalk is the trunk and in it are hidden the secret and power of reproduction of the kernel with which we have to start. No human hand can carve or shape a kernel that will develop this plant and then reproduce a kernel like itself. But the kernel we have followed has this power.

In the stalk is a pith. This pith is connected with a shank or stem that develops into a tender shoot at about the seventh or eighth joint, but the stalk and pith keep on and develop five or six more joints and then send out, at the very tip, a tassel or flower. The tassel comes out first, two or three days ahead of the silks. The tassel is covered with a substance like rye kernels. Each one of the kernels has six pods, very much like pea pods. These can all be seen with the natural eye. Each of these pods has from six to eight grains of pollen in it. When the tassel is four or five days old, it has matured to a point where these little pollen cells or pods burst open (bloom, we say), and these little grains or germs are visible only as a yellow dust, but every particle is a perfect

egg, as perfectly formed as the leaves, the stalk or any other portion of the corn plant. There are supposed to be from 800,000 to 1,000,000 of these minute eggs or germs of pollen on the tassel of a single corn stalk, and each one has a work to do. Can you guess what it is? I will tell you. It is the duty of each pollen germ to find a silk on the shoot below that is just now coming out from the tender shoot. This shoot is virtually the cob of the will-be ear of corn, and is provided with from one thousand to one thousand two hundred silks. These silks have a hollow channel in them, like a hair, and near the point they are covered with bristles. These bristles have a glue on them, and the silk also has a split or pair of lips at the point. These are as anxious to catch pollen as pollen is anxious to find a silk, and when a grain of pollen falls on the silk, it at once penetrates it and dissolves and travels back through the hollow channel to the end of the silk at the cob. Here fertilization takes place and the kernel is produced.

The silk is, properly, the female organ of the corn plant, and the pollen the male organ. Usually the tassel is called the male portion, but it only produces pollen and then dies, having served its mission. The cob is the means of producing the silk and is properly the mother. The silks are only the organ by which fertility is conveyed to each kernel to be formed, and after this is done the silk dies, but the kernel just commences to live and grow. It fastens itself into the cob with a root like the root of a plant. This root extends down through the hard substance of the cob to the pith, and it can be seen. Here it gets its food which is supplied by the thousand roots and leaves; the former have hunted all over the field, and the leaves have drunk from the atmosphere everything necessary for the building of the strong stalk, which, in turn, carries, in the form of a rich, sweet juice, the necessary food to develop starch, protein and oil. These are the three principal parts of a fully developed kernel of corn, from a chemical standpoint. These substances must all be carried up through the stalk and then through the shank of the ear, or the base of the cob, and then to the pith of the cob. Here the thousand baby kernels eat and drink the substance that is so carefully gathered by the mother.

Did you ever think of the cob as a mother? Is it any wonder if there are deformed or under-sized babies in this large family? And yet, if the mother fails to provide food for a single kernel in that family, it will be a runt, just the same as there are runty pigs in a litter if the mother cannot supply them with plenty of nutritious food. And this work the mother must perform every day for about sixty days to produce a perfect ear of corn.

By using an ear that we wish to reproduce and improve as the mother ear, we take the tassel off it and fertilize with another that has other good qualities that we want to have inbred in the mother ear.

Now, you must remember, if you want to get a smaller cob, that the mother ear should have the number of rows you wish on the corn you want to develop. For instance, if you want to develop with twenty rows, don't use mother ears with sixteen rows, but twenty rows, as the kernel has the power of reproduction.

A kernel from a twenty-row ear will be likely to produce, or start to produce an ear with twenty rows. Now, you may fertilize them with another ear with twenty-four rows, but you will not be able to change the number of rows on the mother plant the first season, but you can change the quality or colour of the baby kernel.

We have noticed the way the kernel is formed, how it is fertilized and then grows to maturity. All of this is in regular form and was designed by the Creator. But there is a work for man to do. He cannot make silks or germs of pollen, but he is the husbandman of the field as well as of the flock, and holds at his will the product of his earnest labour. He who would produce pedigreed stock must build safe and secure lots and keep the gates closed to prevent the mingling of scrub stock with the improved family he wishes to develop to a certain colour or type: and just so with the corn breeder. He has an interesting and scientific work to perform, and must perform it in the heat of the day or in the wet dews of the morning. No shirking from duty will win in this campaign for the best corn. Each ear, yes, each kernel, has an individual merit, and the corn breeder must study that merit in order to know what he must do to accomplish his purpose.

Allow me here to give you my method. Use it for all you can get out of it. I arrange my breeding blocks and number the rows, using 1, 3, 5, 7, etc., as male rows, planted from single ears, each ear numbered to correspond with the rows in which it is planted, using rows 2, 4, 6, 8, etc., as mother rows, all planted from single ears; and while we select the best we can find, you will be surprised to see the difference at husking time in these rows. This you can not tell or see if you mix the ears.

Now let us go back and start a block from two ears. No. 1 is an ear of very high quality of Reid's Yellow Dent. No. 2 is an ear of very high quality of Mammoth Johnson (yellow). I want to combine these two varieties for a special purpose, and in order that you may understand the work it will be necessary for me to show you the quality of each and the object I had in view in breeding them together.

Reid's Yellow Dent is one of the older varieties of yellow corn, and is a half blood, having been mixed in 1847, I believe, with small yellow corn on the larger flesh coloured corn brought from Ohio, by Robert Reid, to Delvin Prairie in 1845. This mixing was done by replanting the larger flesh (or reddish) coloured corn, which was a poor or thin stand that year, with the small yellow corn. This was not corn breeding

though it was a very valuable piece of work; but it took a good many years to develop Reid's Yellow Dent to its present state of high protein and high oil and its extremely prolific qualities. These were the qualities I wanted to preserve if possible. Figure 2 represents a perfect type of Reid's Yellow Dent.

Mammoth Johnson is also an old variety, but its origin is not definitely known. I obtained seed from a good corn man who had carried his seed out of the field each year for fifteen years. He never attempted to breed corn and had depended altogether on field selection. This corn came under my examination and its beautiful colour, straight rows and cylindrical ears, with nicely covered tips, at once attracted my attention.

I had some of it analyzed and found it lower in protein than Reid's Yellow Dent. I also concluded the kernels had a little too much space between the rows. I decided to breed them together and see if I could not retain the colour of Mammoth Johnson and its straight rows, breed some more oil and protein into it; make it more prolific, like Reid's Yellow Dent, and make it mature earlier, if possible.

Next I will take up the breeding block in detail and show how we can register and pedigree corn.

How can we pedigree and register corn? Let us take the ears we used above, No. 1 as Reid's Yellow Dent, and No. 2 as Mammoth Johnson, and let us change them to A and B, for convenience, calling Reid's A and Mammoth Johnson B.

I want to preserve B's straight rows and fine colour, so I use it as the mother ear and plant it in my block No. 1 in rows 2, 4, 6, 8, 10, etc. I want to get some more oil and protein into B and make the kernels that grow on B more prolific, so I plant A in rows 1, 3, 5, 7, 9, etc. These ears have one thousand kernels and will plant ten rows, each thirty-six hills long, or eight rods. Planting three feet eight inches apart this makes block No. 1 twenty rows wide and thirty-six hills long of separate varieties of corn. If we let them alone they will mix, each fertilizing the other. Thus you will know little or nothing about what you have done; you might just as well, yes, better, have shelled these two ears together and planted them in twenty rows. This is the way some men pretend to breed corn. That is nothing but mixing corn, and that is the very thing every good farmer is trying to avoid.

Well, then, what is corn breeding? Corn breeding is the art by which we can tell what relation one variety is to another or how they were mated together. Thus in block No. 1 we wish to fertilize B with the pollen of A, so we watch for the tassels, and as fast as they come in sight we pull them out on all the rows of B and let all the tassels of A grow and fertilize B, and also itself. Now we have B a half-blood, but A remains the same, because every kernel received life from A; but B

Horsesickness.

PROGRESS REPORT BY MR. H. WATKINS-PITCHFORD.

MR. H. WATKINS-PITCHFORD, the Government Bacteriologist, has sent the following progress report on Horsesickness investigation work to the Minister of Agriculture:—

Sir,—I have the honour to forward herewith for the information of the Minister of Agriculture a further brief progress report dealing with the recent field tests undertaken in connection with the investigation of the disease Horsesickness.

Attached will be found a report from my assistant, Mr. Harber, showing the present state of the enquiry at the Tugela Camp.

The details of this Report are of interest and significance, tending to prove conclusively the correctness of the theory that the immunity of the horse to Horsesickness is a matter of degree, varying not only amongst different animals but fluctuating in the system of the individual, and rarely, if ever, attaining to such a degree of immunity as will suffice to resist throughout life an infection which seems to vary so greatly both in degree and kind.

It is improbable—as Mr. Harber points out—that the intensity of the Horsesickness infection in the Tugela Valley in summer can be surpassed in virulence in any other part of the Sub-continent.

The exposure, therefore, by night and day, of the experimental animals in this locality must be held to constitute a test as severe in its nature as any horse is likely to be subjected to, and far more severe than the average horse will encounter. The results of the exposure of the experimental horses to such conditions are given briefly in the report subjoined. All the control, or untreated horses, have now succumbed, while three of the treated horses have also died from uncomplicated Horsesickness, leaving ten of the treated or protected horses which have resisted for a long time the very virulent natural infection of the locality.

Of the protected mules, the original number (22) have resisted the disease, while of the eight unprotected mules—which were all old animals—three have died from Horsesickness and another is reported as dying at the date of writing. The original object of this field enquiry—which was to ascertain whether the treated animals possessed any immunity to the disease, and, if so, to what extent—has been successfully attained, and there is no room for doubt that the inoculations to which these animals have been subjected have increased to a great extent their powers of resistance to the disease. It is probable that had the treatment of these horses been more prolonged or more frequently repeated,

the degree of resistance induced would have sufficed to have avoided any deaths whatever amongst such animals.

The endeavour throughout has been, however, to keep the process or details of treatment as simple and practicable as possible in the hopes of raising or increasing the immunity of the horse just so far as will suffice to withstand the infection encountered under ordinary summer conditions. More than this has not been attempted.

On the other hand, it must be remembered that the test animals have not been subjected to hard work, and it may be that prolonged exertion would not have been followed by such encouraging results. Against this, however, it seems fair to place the fact that infection has been constant, excessive and prolonged, factors which would not obtain under ordinary conditions.

The value, however, of the observations from a comparative point of view remains unimpaired, and, while the entire and absolute immunity of all the treated animals was not reasonably to have been expected, it was hoped that the enquiry would result in determining the difference between treated and untreated animals, and that in so doing it would demonstrate the value of the process devised as a possible means of increasing the resistance or immunity of the horse and mule to a serviceable extent.

It is possible that in time more of the protected or treated animals now at the Tugela Camp would succumb if they continued to be exposed to such abnormal conditions of continuous and excessive infection, but whether this may be so or not the protection already enjoyed by these animals in the past must have been of a substantial nature and such as was not shared by the fifteen control horses and mules which have already succumbed to uncomplicated Horsesickness.

As this report is only intended to deal with the results of the tests now satisfactorily concluded at the Tugela Camp, such as are dealt with in the accompanying report of Mr. Harber, I have not attempted to deal with the other lines of the investigation, which will, I hope, furnish material for a further progress report at no distant date.

It is now my intention—as all the control or unprotected horses have succumbed—to close down this experimental camp. The services of my assistant are urgently needed in connection with other branches of work, and one or two of the native assistants have experienced attacks, of malarial fever. As the main object of the enquiry has been attained, no great advantage will attend the further prolonging of the Camp, and I shall endeavour to arrange for the maintenance of some of the experimental animals upon the Coast and return others to the Laboratory for further observations.

The practical outcome of the work dealt with above appears to me to consist in the adoption of the process upon adequate lines in a district

in which a recurrence of the disease may be confidently expected every year.

I have already approached the Commandant-General of Militia with reference to his concurrence in the inoculation of the horses of one of the mounted Regiments most exposed to the risk of infection.

Such inoculation should preferably be made during the winter months in order to ensure the establishment of a serviceable degree of immunity before the onset of the next sickly season. An arrangement of this sort would, I believe, meet with the approval of the Minister.

This broad and adequate application of the process before general adoption is attempted is greatly to be desired, inasmuch as the investigation of this disease in the past has been rendered slow by a meagreness of resource and a reluctance to attempt conclusions based upon insufficient data, difficulties which would be to a great extent overcome if facilities such as those afforded by the horses of a mounted regiment could be secured, the animals of which are already insured by and under observations of officers of the Government.

It is my duty to acknowledge the assistance and encouragement which has been extended to this important branch of research by the Minister and by yourself whenever opportunity for such has arisen.

I have the honour to be,

Sir,

Your obedient Servant,

(Sgd.) W. WATKINS-PITCHFORD, Lt.-Col.,
Government Bacteriologist.

To the Government Bacteriologist.

Dear Sir,—I beg to further report upon the progress of the work of the Horsesickness Experimental Camp, at the mouth of the Tugela.

Since my report of June last, the Camp has been visited with as severe Horsesickness conditions as would exist probably anywhere in South Africa.

As I have reported to you from time to time, three of the protected horses have succumbed from uncomplicated Horsesickness, which deaths were due doubtless to the condition of intense natural infection.

Ten of the protected horses are still living, this in spite of the intense infection which has been so virulent as to cause the death of twelve of the control or unprotected horses, of which there are now none living—most of them having been dead of Horsesickness for some considerable time.

Of the twenty-two protected mules there have been no deaths from Horsesickness although quite a number of reactions have been recorded.

Out of the eight control mules three are dead, and I expect another will shortly succumb.

It will be seen from the foregoing facts that the process of protecting horses, though not absolute, greatly increases their power of resistance to Horsesickness, and should do much to reduce the mortality among stabled and cared-for horses.

(Sgd.) A. F. HARBER, M.R.C.V.S.

Sugar Cane Cultivation.

THE SYSTEM RECOMMENDED FOR CUBA.

IN his recently-published book, "Southern Agriculture," Professor F. S. Earle, the Director of the Cuban Agricultural Experiment Station, deals at considerable length with the systems of cane cultivation in vogue in different countries, and among other things he gives an account of the system recommended by the Cuban Experiment Station to cane cultivators in that island. This account is summarised by the *Agricultural News* of Barbados in its issue of the 14th November, 1908.

The system recommended is an improvement upon that which has long been in use by Cuban growers, in that it advocates a better preparation of the land, the growth of a leguminous crop before planting the canes, and the intelligent use of commercial fertilizers.

The land which is to be planted with cane in October or November should be ploughed about nine months previously (February or March), and a leguminous crop, such as velvet beans, sown in April or May. About August this crop should be ploughed under, and the land harrowed two or three times with the disc harrow. When the canes are to be planted, it is recommended that deep furrows, at distances of about 7 feet from each other, be opened by a double mould-board plough, and a complete manure of artificials (where necessary) distributed at the bottom of the furrows previous to planting. The cane used for planting purposes should be selected from vigorous plant canes or first ratoons, and the pieces set horizontally in a continuous row at the bottom of the furrows. If the soil is moist they need not be covered to a depth of more than 3 inches, but if dry, a depth of 6 inches of soil is recommended.

Harrowing takes place just as the shoots are peeping through the

ground, the harrows being drawn in the same direction as the rows run. This operation greatly encourages early growth. Cultivating or hoeing begins when the plants are well up: this is usually done in Cuba with a horse cultivator, and the hand hoe is needed only for removing weeds and loosening the soil between the plants in the rows. It is recommended that the operation be repeated frequently in the early months of the year in order to keep down weeds, and to maintain a surface mulch of loose soil. In April, or early in May, it is advised to sow cowpeas broadcast between the rows of sugar cane, covering them afterwards with the horse-cultivator.

The above method of cultivation is specially adapted for lands which have good natural drainage, but on land deficient in this respect, the system should be modified, and the land ridged up around the canes by means of disc cultivators.

In Cuba, ratoon crops of sugar-cane are produced for several years on the same land, and provision must be made for maintaining the soil in good condition and keeping up the supply of plant food. The methods devised by the officials at the Cuban Experiment Station for this purpose is as follows: as soon as the cane is cut, a horse rake is drawn across the rows, and worked so that the trash from the first "middle" (*i.e.*, the space between two rows of cane) is pulled on to the second, and that from the third middle on to the fourth. In this way the spaces between the rows across the field are alternately bared or double-trashed. The cleared "middles" are now ploughed, the soil being turned away from the cane rows, and the last furrow runs close up to the cane so that artificial manures can be applied around the roots, if necessary. The soil is then thrown back by a cultivator, and is kept well tilled by regular cultivations until the beginning of the rainy season, when the ratoons have grown to a good height. At this time the cultivated middle spaces are sown with cowpeas.

The alternate spaces which have been double-trashed are so thickly and heavily covered that practically no grass or weeds can come through, and these portions receive no further attention during the season.

It will be seen that with this system of cultivation the ratoon cane crop is growing under excellent cultural conditions, for one side of each row is thoroughly cultivated, while the other is protected by a heavy mulch of trash, which serves to retain moisture. In the following year, with the second ratoon crop, the treatment of the middles is reversed, the spaces on which the cowpeas were cultivated in the previous year being doubly trashed, and *vice versa*. In this way the soil all over the field is thoroughly aerated and pulverized once in every two years.

The Automobile Hoe.

A NEW APPLICATION OF AUTOMOBILISM TO AGRICULTURAL MACHINERY.

IN a note in our last issue we referred to the new use to which motors are now being put to in America for the driving of harvesters, the motor being mounted on the harvester. A recent issue of the *Scientific American* describes a further example of the application of automobilism to agricultural machinery—an automobile hoe or cultivator. This new implement, which is designed especially for the cultivation of beets and other crops planted in rows, has six blades and is driven by an explosion motor, by means of gearing. The chassis, constructed of steel angle bars, is pointed in front and rests on four wheels, of which the front pair serves for steering and the hind pair for driving. In the front of the machine is a two-cylinder, four-cycle motor of 10 or 12 horse-power, which may be adapted to burn either carbureted alcohol or gasoline by an easily effected change in the carbureter. The feed and escape valves may be controlled by hand, and the ignition is furnished by accumulators, an induction coil and electric bougies. The bearings are continuously lubricated by a mechanical device. The cylinders are cooled by water, which is continuously pumped through a radiator of the wing type, which is shown very clearly in the second of the two illustrations, for which also we are indebted to the *Scientific American*. On the axis of the flywheel and almost surrounded by its rim is a conical friction clutch, so constructed as to exert no lateral pressure on the collars. This clutch is connected by an elastic sleeve with the speed changing box, which contains two trains of gearing, one for forward, the other for backward motion, the latter effecting a reduction of speed in the ratio of 1 to 3. The differential is controlled by an endless screw. The maximum speed of the machine is about 2 feet per second or a mile and a quarter per hour. Because of the reduction mentioned above the speed backward cannot exceed 8 inches per second. The driver sits in the centre of the machine and steers by means of a Galle chain connected with the front pair of wheels. But the apparatus is so arranged that the position of the operator may be varied to suit the requirements of the work. In some cases he walks behind the machine, where he can watch the hoes and regulate the speed accordingly. On reaching the end of the row the machine turns on one of its driving wheels as on a pivot, and that wheel returns along the track made by it in coming.

The automobile hoe complete weighs 2,750 pounds, and cultivates a strip more than 8 feet in width. Over horse hoes it possesses the ad-

vantage of suppressing the trampling of the young plants, in addition to greater uniformity of action. Hence it will, doubtless, be generally employed wherever drilled crops are cultivated on a large scale. By the substitution of blades of special form the machine can be adapted to accomplish, rapidly and neatly, the preparation of the ground before sowing, which is so important, especially in the cultivation of beets.

Paper from Maize Stalks.

INVESTIGATIONS IN THE UNITED STATES.

IN our last issue we drew attention to the discovery, which it is stated has been made by the chemists of the United States Department of Agriculture, of a substitute for wood pulp—namely, mealie stalks. A communication has now been received by the Minister of Agriculture from the Commercial Agent (Mr. Harrison), who has been making enquiries on the subject.

Mr. Harrison has been in correspondence with the United States Department of Agriculture in Washington, and has received the following communication:—

“The announcements in the public press on the results of investigations on the manufacture of paper from cornstalks are not authentic or entirely accurate. It is true, however, that the Bureau of Plant Industry and the Forest Service of the Department of Agriculture are investigating the use of vegetable fibres other than wood as raw materials for paper making. No publications have yet been issued and there probably will be none until the work is completed.

“A Forest Service press bulletin, giving some of the results already obtained, is now in preparation, and I will see that you obtain a copy of this bulletin as soon as it is ready for distribution.”

The Commercial Agent also encloses with his communication a copy of an article sent him by the Board of Trade and culled from the *Paper Mill*, on the subject of cornstalk paper which explains the process. The article runs as follows:—

“Washington, October 14th, 1908.—Experiments conducted by chemists of the Bureau of Forestry and Plant Industry in the new Laboratories here have demonstrated, it is said, that paper can be made from cornstalks, by much the same process as that used in treating wood

pulp, at a cost, when machinery has been perfected, of a little over half the cost of making it from wood pulp.

"The scientists feel sure that it is absolutely practical, the newly discovered process having been subjected to every test.

"Samples of the cornstalk paper made by Dr. H. S. Bristol and his assistants were shown to-day. It is made in five grades of different colour and texture. The first grade is of dark gray colour and heavy texture, resembling parchment. It is almost as tough as sheepskin and commercially might be used for many purposes.

"Another grade is of a lighter gray of the same character. There are two shades of yellow and one of white. The white paper is made from the hard outside shell of the cornstalk and the yellow from the inside, or pith. The yellow paper has a large fibre, and in many respects is like the paper manufactured from rags and linen, soft and pliable, and might be utilised by newspapers.

"In making paper from cornstalks the scientists have used the "soda" process, which is acknowledged by paper manufacturers to be the best means of making paper from wood pulp. The cornstalk pulp is cooked for from two to two and a half hours; it takes from twelve to fourteen hours to cook wood pulp.

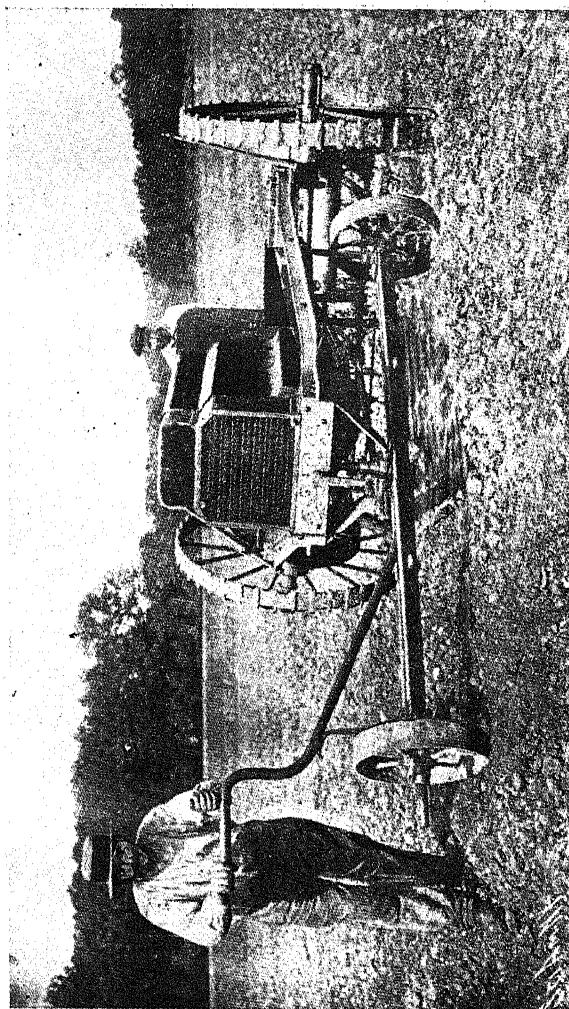
"Dr. Bristol says he has already made paper from cornstalks almost as cheaply as it can be made from wood pulp. It has taken fifty years to develop the present methods of making paper from wood pulp. Dr. Bristol believes that when proper machinery is built and the farmers realise that a good revenue may be derived from the sale of cornstalks, paper will be manufactured from the new material at half the cost of wood pulp paper.

"With wood at \$8 a cord, paper is made from wood pulp at a cost of \$13 a ton. Cornstalks can be bought for \$5 a ton and the paper made with the present primitive machinery for £14 a ton."

Natal farmers will follow with interest the progress of these investigations, for if it is found feasible to manufacture paper from mealie stalks upon a paying, commercial basis, there will be a good future before Natal as a paper manufacturing country. At present most of our mealie stalks are wasted every season, but if they can be sold to paper factories they will prove a welcome source of income to the farmer.

Mr. Harrison has promised to keep the Department of Agriculture informed as to the progress of the experiments, and any information of interest to our readers which may be received will be published in the *Journal*.

Exertion for the meeting of individual wants is *labour*; play is exertion that has no end beyond itself.



THE AUTOMOBILE HOE.—II
The Automobile Hoe Turning.

Inter-Colonial Agricultural Union.

(Continued from page 1591, Vol. XI.)

RAILWAY MATTERS.

There were several resolutions bearing on railway rates, etc.

Mr. King (Natal) moved:—

“That this Congress is of opinion that the Railway Administrations should be requested to consider the advisability of carrying stock and produce intended for exhibition at agricultural shows free of charge.”

Much talk was heard, he said, as to railways being worked on a business basis; he was not sure that this was not a good business principle.

Mr. De Villiers: Is this a matter of charity.

Mr. Johnstone (Natal): No; it would especially assist small societies to continue their operations.

Mr. R. H. Struben (C.C.) thought the request was unreasonable. It was hopeless to ask the Cape Government for any such concession. How could he ask a Government already in difficulties to go further into debt?

Mr. Poultney thought the trouble had come from his Colony (Transvaal). Their General Manager said he thought their rates were as favourable as those of Natal and the Cape, but when they proved to him that the Transvaal rates were 110 per cent. higher, he replied that the other Colonies would have to level up. He knew their General Manager would not allow judges and exhibits to travel free. If they asked for half fare for the double journey they might get it.

Mr. Evans (Natal) said when stock was sent free in Natal, stuff was sent to the shows which was quite unfit; it was simply sent on the off-chance of sale.

Mr. King (Natal) dissented, but the motion was lost by a big majority.

Another motion to the effect that railway rates should be sufficient to cover cost of haulage and handling was withdrawn.

WOOL CARRIAGE AT COAL FREIGHTS.

Mr. Struben (Transvaal) moved:—

“That in the interests of the wool industry, it is desirable that the railway rates, now being charged for the transportation of this staple product to the coast, should be reduced to the freight for coal.”

He said the cost of carrying wool was about 1½d. per ton per mile, whereas coal was carried for ½d. per ton per mile. Considering so many trucks were sent empty to the coast, he thought wool should be carried at the cost of coal.

Mr. Robertson seconded.

Mr. Palmer (Director of Agriculture) thought the resolution an impossible one if the mover claimed the same rates for wool as for coal. The railway authorities would not treat with such a resolution. For instance, he pointed out the space occupied by a ton of coal compared with that taken up by a ton of wool. O.R.C. farmers took the matter up with the C.S.A.R. and the reply was that the freight could not be reduced unless the wool were compressed.

Mr. Evans (Natal) protested vigorously against the suggestion that wool should be carried at the same rates as coal. He pointed out that even if the price of wool were only 6d., the value of a ton of wool would be £50, whilst that of a ton of coal would only be 7s. 6d. at the pit's mouth, and what was more coal went down by train loads as compared with wool by truck loads. The £50 worth of wool could afford to pay 1½d. a ton per mile, and could not be treated on the same basis at all as coal.

Mr. H. Wiltshire (Natal) also pointed out that the railway scarcely handled coal at all. It was loaded straight into the trucks at the mine and unloaded at the destination by the consignee; the coal trade was going on all the year round providing a regular income; wool carriage was only for a short season of the year.

The original resolution stood without the words "at the same freight as coal," the request being that the rates "be considerably reduced." This Mr. Van Alphen thought more reasonable and would support, but he could not ask that coal freights be applied to wool.

Mr. Struben consented to leave the resolution in its original form.

Another delegate pointed out that wool could not be compressed before it had been seen by the buyer; and yet another that the disadvantages of compressing might outweigh any slight advantage in lower rates.

The amended motion was carried by 17 votes to 2.

Mr. T. W. Hunt (Transvaal) moved:—

"That it is desirable that wool bales, sacks, fruit boxes, and other materials designed for the packing and conveyance of South African agricultural products, should be carried on the S.A. Railway system at especially low rates."

He remarked that it was absurd and a disgrace to the railway systems of South Africa that it should cost more to bring material from Durban to the Transvaal than the original cost of the material plus carriage by sea from Europe to Durban.

Mr. King (Natal) thought this was more a question for the Customs Union. The freights on over-sea boxes and material complained of by Mr. Hunt were for the protection of the South African article.

The motion was carried by a small majority.

DOUBLE-DECK SHEEP TRUCKS.

Mr. Hunt moved:—

"That this Conference exercise its influence to obtain the use of

double-decked trucks on the railways of South Africa for the conveyance of small stock, such trucks to be provided at the same rates as those now prevailing for single trucks."

Mr. Hunt said the sheep trucks of the South African Administration were a disgrace to any country. The railways knew how to charge the farmer and in many instances did not give value for the money. They should press the South African Railways to be up to date and use the same class of cars as Australia and New Zealand.

Mr. Bailey seconded.

Mr. Mitchell remarked that in Natal the excuse of the Railway Department was that there was insufficient small stock carried to justify the expense of double-deck cars, but now that sheep were increasing so rapidly was the time to press home the point.

Mr. King pointed out that double-deck cars could be used for no other purpose, so that Government would be unlikely to go in for them without making proper enquiries as to whether they would be justified. He favoured asking that something should be done by way of experiment.

In reply to the Rev. Scott, the mover consented to strike out the words after stock.

Mr. Ernest Edmeades moved:—

"That this Conference request the various Governments to institute enquiries as to the practicability of double-deck trucks for the conveyance of small sheep over the various railway systems."

He thought this would overcome all the difficulties.

The Secretary: All the difficulties of the railways. Some members thought the use of double-deck trucks would increase the torture of sheep in transit.

Mr. Borthwick seconded the amendment, and said small stock at the present time suffered quite enough in transit, and if the proposed new mode of conveyance was going to increase their torture Congress should not support it. The Cape conceded the request of some farmers to accept more sheep per truck, but it was so abused that small stock were frequently removed from trucks dead. Then the number was reduced to 42 with a sort of compromise that farmers might truck more if they took the risk. He favoured enquiries and experiments before adopting any such proposal.

Mr. Hunt, in reply to the debate, thought the double-deck truck more humane than the present conveyance with no cover except a net to prevent the sheep jumping out. He pointed out it was as much a danger to put too few sheep into a truck as too many.

The amendment was lost and the original motion carried.

ERADICATION OF SCAB.

The following motion was on the agenda for re-affirmation:—

"That this Conference suggests that the various South African

Governments be approached with a view to the appointment of an Inter-Colonial Commission for the purpose of framing Scab Laws, which shall be, as far as possible, on the same lines, and uniformly stringent in each territory."

Mr. R. H. Struben (C.C.) remarked that the resolution called for certain definite action by the different Colonies. In view of the fact that a large section of the farming community believe that scab does not have an effect on the market, and with a view of educating them on the subject, he moved as an addition to the resolution:—

"That this Conference urges on the various Governments of South Africa the necessity of appealing to farmers for loyal co-operation in the eradication of scab, and in undertaking to take educational steps to prove to sheep-farmers the ultimate great financial benefit that must accrue from the eradication of scab even at the cost of temporary loss by reduction in the price of wool and skins."

This was seconded.

Mr. Robertson, speaking for the Transvaal, said active educational measures on scab were no longer necessary. The majority of farmers recognised that scab could be eradicated, and they were trying to do it. (Hear, hear.) The Transvaal were, rather, talking of passing legislation dealing with compulsory dipping and quarantining. Passing such a resolution as that coming from Mr. Struben would not help at all. They must ask the Government to take stronger measures.

Mr. Johnstone (Natal) pleaded for unity of action and similar laws throughout South Africa—and vigilance in seeing that they were stringently carried out. (Applause.)

Mr. Nicholson confirmed Mr. Robertson's view, remarking that the Government had written to the Cape Government pointing out that scabby sheep had been sent from the Cape to Rustenburg and Marico districts. General Botha had called a meeting for the 9th January next. The circular announcing the meeting contained regulations more stringent than any now in force on the subject. But no matter what they did in the Transvaal, South Africa could not be free from the pest until its laws were uniformly stringent. Scab was probably robbing South Africa of £250,000 a year. He invited all present to vote for the original motion.

Mr. Ehrlich spoke of the "milk and water" character of Mr. Struben's proposal. No motion could be too strong on the subject. The time had gone for pious resolutions like Mr. Struben's. Let them lay down what they wanted; they knew the requirements very well. The O.R.C. was the only Colony where simultaneous dipping had been in existence for the past five years. He admitted that the regulations had been relaxed. (Laughter.) The improvement realised in the eradication of scab may have justified the Government in thinking relaxation advisable, but he, the speaker, thought the time was unripe for any

weakening of regulations on the subject. The great danger was trek sheep coming from the Cape in times of drought; that was the problem they alone could not solve; there must be inter-colonial action.

The Rev. Mr. Scott (Natal) intimated that it was owing to the initiative of the Natal Agricultural Union that Natal was educated up to the position she occupied to-day in regard to freedom from scab, and Mr. King said Natal would be free from scab to-day but for the other Colonies.

Mr. Bailey advocated the native being treated in the same way as the white man was or all their efforts would be in vain. So far as he knew there was not a single dipping tank in any location in the Transvaal.

Mr. Hunt said it was absolutely necessary for the future of the wool industry of South Africa that scab should be eradicated as soon as possible. The whole trouble was that certain Governments pandered to the men who wanted anything but progress. (Laughter.) They must give such Governments to understand that they were going straight for the pest and that they were going to have scab eradicated in the shortest time possible. (Hear, hear.)

Mr. De Villiers (Cape) assured the Congress that although scab was rife in the Cape years ago, it was now becoming unknown in some districts.

Mr. O. E. G. Evans (Cape) feared from remarks dropped that there was an idea that the Cape was very scabby. (Laughter.) In his district, for instance, there was very little scab. He hoped scab regulations would become more stringent than in the past.

Mr. R. H. Struben resented being told that the Cape had "milk-and-water" views on scab, and claimed that he moved for simultaneous dipping throughout the country at the Pretoria Conference, but it was said he was going too fast. At the Cape Congress he moved to do away with "milk-and-water" dips and that caustic soda and sulphur be the recognised dip. So that he claimed they were not behind other Colonies in the desire to eradicate scab. All he asked for was that statistics should be gleaned and proofs compiled to convince the backward man that scab can be eradicated and that eradication will benefit him and the country at large. At the same time he concurred with the motion on the paper.

The motion was carried unanimously, only three having voted the addition moved by Mr. Struben.

LABELLING PRODUCE.

The following resolution was adopted:—"That this Congress is of opinion that for the public protection and the encouragement of the sale of South African meat and other South African produce, all produce imported from overseas should be clearly labelled as such by the seller."

Agricultural Research.

TWENTY YEARS' WORK IN VERMONT, U.S.A.

II.—STOCK AND DAIRY HUSBANDRY.

LAST month we published a short account of investigations undertaken by the Vermont Agricultural Station into fruit and general crop growing, confining ourselves to the results of such investigations as were likely to prove of interest to Natal farmers. This month we conclude our notice, dealing with stock feeding and dairy husbandry.

STOCK FEEDING.

Effect upon Milk Flow of Addition to Ration of Emulsified or Unemulsified Fat.—Sundry investigators having published the results of experiments into the advisability of adding an extraneous fat to a cow's ration as a means of improving the quality of the milk ("feeding fat into milk"), trials with four cows in 1898 and ten cows in 1899 were made, using raw and emulsified cottonseed oil and emulsified maize and linseed oils. These were fed with maize meal and bran against the same rations without oil. Milk yields to the unit of dry matter eaten were always increased when oil was fed, the increase amounting from 3 to 9 per cent. Total solid and fat yields were increased by the cotton seed oil feeding from 2 to 15 per cent. and on linseed oil feeding 2 per cent., but not on maize oil feeding. The fat content was always increased at the outset, but quickly returned to normality or less when maize or linseed oils were fed. This increase—unaccompanied by rise in the percentage of solids-not-fat—was fairly permanent, lasting from 4 to 6 weeks at least, when either raw or emulsified cottonseed oil was used. Since the same changes were brought about when raw oil was fed as followed the use of emulsified oil, it is safe to say that emulsifying was of no avail as a means of feeding fat into milk.

Feeding Value of Buckwheat Middlings.—Ten cows were used during two seasons. When 4 lbs. buckwheat middlings replaced 1 lb. mealie meal and 1½ lbs. each of cottonseed and linseed meals, production dropped about 3 per cent.; when it replaced maize meal, the production gained about 4 per cent. The results the second year were more pronounced. A buckwheat middlings ration seemed fully equal to a cottonseed-linseed ration and carried a shade more digestible protein. It made from 8 to 11 per cent. greater product than did the ration of half maize and half bran. Whenever fed, the quality of the milk was improved nearly 0.20 per cent. This disproportionate increase in the fat content was observed

both years. Buckwheat middlings fed in considerable quantities tends slightly to increase the fat percentage of milk.

Feeding Value of Hominy Feed.—This breakfast food residue was fed daily two successive years, each year as compared with bran and with half and half cottonseed-linseed meals and the first year also as compared with gluten meal, 16 cows being employed the first and 11 the second year. It proved equal to average wheat bran as a milk maker and to be superior to a rather inferior grade thereof; but it was not equivalent of either gluten meal or the cottonseed-linseed ration; neither was it as economical a concentrate as were these.

Feeding Value of Dried Molasses Beet Pulp.—This material, a residue from diffusion batteries of beet sugar factories mixed with residuum molasses, was fed for six months to six cows in comparison with wheat bran, and to five cows in comparison with silage. Pound for pound of dry matter it seemed essentially equivalent in feeding value to wheat bran and mature maize silage.

Heavy Grain Feeding.—An increasingly heavy grain ration was fed to three cows. It began at 6 lbs. and reached 12 to 14 lbs. daily. The nutritive ratios ranged from 1:5.6 to 1:7.9 with two cows, and from 1:3 to 1:6 with the other. One cow maintained the flow and its quality for 34 days; another "responded to an additional pound of meal with an increased milk yield of better quality." Both shrank when put for 15 days on nearly equivalent amount of a wider grain ration. When placed on another grain ration of equal weight but narrow ratio, one held her own, the other continued to decrease in yield. A farrow cow fed equal weights of bran and cottonseed meal, beginning with 6 pounds daily and increasing to 12 pounds, slightly bettered her flow. On 10 pounds bran and gluten feed she bettered it yet more; and on 10 pounds clear bran she lowered it. No unfavourable effects on cow or product resulted during the two months' trial.

Feeding Values of Beets and Carrots.—Two cows were fed for 16 weeks on beets and carrots. Carrots far surpassed beets in feeding value.

Feeding Value of Artichokes.—A single cow was fed artichokes as compared with silage. Ten per cent. less milk was made on the silage to the unit of dry matter. The quality of the milk was unaltered. It claimed for the French improved white artichoke that all sorts of animals would eat readily both tuber and stalk. The cows ate the tubers well but not a single one would eat the stalks.

Feeding Value of Pumpkins.—Three cows were fed under conditions where pumpkins, seeds and all, were substituted for silage, about 2½ pounds of pumpkins being fed in place of 1 pound of silage. Practically the same production, but 5 per cent. more of the unit of dry matter, was made on pumpkin feeding than on the silage ration. The quantity of the milk remained unchanged.

Feeding Value of Apples.—Four cows were fed in alternative periods rations where apples replaced three-fourths of the silage. Eight per cent. less product was made on the apple than on the silage ration. The former contained, however, 8 per cent. less food; hence the unit of dry matter made as much on one ration as on the other. The quality of the milk was not altered. Pound for pound, apples did not prove equal to silage. Pound for pound of dry matter, they appeared to be nearly as useful. Apparently they have about 40 per cent. the feeding value of silage. No damage resulted to the cows from somewhat liberal feeding.

Effect of Grooming of Cows upon the Milk Flow.—Eight cows in two seasons were uniformly fed, but were either groomed or left ungroomed in alternating periods. The first year no appreciable effect was observed; the second year, 4 per cent. less milk was made when the cows were groomed. The quality of the milk was unchanged. Grooming cows should tend to better the keeping quality of milk and the grade of the butter, but does not seem to add to the milk flow or its fat content.

Wool and Wool Measurements.—Samples were taken from shoulders, bellies, hips, thighs, body wrinkles and neck wrinkles of two rams and two ewes. They ranged from .00089 to .00108 inches in diameter and in the order stated. The ewe wool was a trifle less coarse than that of the rams (.00095 *vs.* .000967 inches). A trial of the effect of nitrogenous and carbonaceous rations on wool fibre measurements was indeterminate in its outcome.

Pig Feeding.

Sour skim-milk produced just as good or a shade better results, pound for pound, as did sweet skim-milk. Two ounces of maize meal to each quart of skim-milk made a pound of pork at the least cost for food. Larger amounts of maize meal produced more rapid growth, but at an increased cost for food per pound of pork. A method of feeding early in life which tends to develop bone, muscle and digestive organs, rather than to form fat, builds a foundation on which greater profit may be made when heavy feeding begins in preparation for market. During the finishing off process 12 quarts of skim-milk daily per pig, with all the maize meal that would be eaten, produced a more rapid growth at less cost per pound than did 6 quarts of skim-milk under similar conditions.

It is usually stated that bulky or watery foods tend to promote stomachic and intestinal growth and to increase the shrinkage. Yet in a series of tests the shrinkage of pigs fed bulky feeds was little if any greater than that of pigs fed more concentrated rations, while the shrinkages on watery and on concentrated rations were identical.

To the query whether it is "more profitable to feed skim-milk freely or to feed less, making up the shortage in grain"—or, in other words, the relative economy of diluted or concentrated rations—the answers given were: "No marked effect one way or the other"; and "The cost of

food per pound increases and the profit slightly favoured the less watery ration."

The relative feeding values of skim and butter milks are stated in one case to be as 5:4 and in another as equivalent.

The relative feeding values of maize meal and whole corn were twice determined with results "slightly" in one case and considerably in the other in favour of the meal. Doubt was expressed "whether the gain was equal to the cost of grading." Feeding meal wet gave better results than feeding it dry.

Bee-keeping.

Trials made during three seasons were held to warrant the following statements:—

No perceptible difference was noted between different sized frames in wintering or building up in the spring.

Double brood chambers for wintering and spring building up did not prove useful.

Stimulative spring feeding proved injurious.

Bees will make use of scrap wax in comb construction during the honey flow.

The periodical removal of all drones and drone brood failed to prevent swarming.

The removal of the queens during honey flow was of no avail.

No difference could be detected by experts in the quality of honey produced under otherwise similar conditions upon different comb foundations. The Weed new process foundation was thought superior.

The honey made by bees fed with cane sugar syrup did not differ materially in composition from that directly adulterated. Such as was made when the bees were fed but 20 pounds a week was somewhat more like normal honey than that made when they took 20 pounds a day. In each case some laevulose (honey sugar) was formed and a trace of acid added.

Feeding back extracted honey for section filling did not succeed well.

Tests made seem to indicate that the winter temperature of the hives may vary without detriment to the bees.

IV.—DAIRY HUSBANDRY.

Effect of Age on Milk.—The year records of 99 cows, comprising 427 years of bovine life, were studied to note the effect of advancing age upon milk yield and quality. At the outset and until seven years old, the milk flow tended to increase, the eighth year flow was inclined to be lower than that of the seventh and ninth and to resemble that of the tenth

year. No cause was found nor is stress laid upon this. From the ninth year onwards the trend was downwards. As regards percentages of total solids, fat, and solids-not-fat, in most cases the trend was downwards. It is stated that heifers usually give nearly their lifetime fat content in their first lactation. The effect of advancing years are not important until old age becomes imminent.

Quality of the Milk of Strippers.—Stripper milk is richer in fat and solids-not-fat and of a higher specific gravity than the average of the milking period if the cow is in calf. If she goes dry when farrow or when but recently served, the quality is not usually unhandsome.

Effect of Fatigue on Milk Flow.—Three trials were made on the effect of fatigue on the milk flow, the cows being driven ten to twelve miles and carried 50 to 70 miles by rail. In the first trial of 25 cows, half gave richer milk the night of their arrival and all richer milk the next morning, than they did two weeks later, the fat being the most variable constituent. The quantity was unfavourably affected. In the second trial it was found that fatigue lessened the flow temporarily; affected its quality seriously for the first one or two milkings, and raised the quality after a little while. On the third trial, six cows, 18 hours *en route* and not milked during this time, showed temporary enrichment of the milk for a day or two. Apparently there was no serious milk shrinkage. It seems safe to conclude as a result of the three trials that fatigue tends to lessen the flow temporarily, and variously to affect the quality for one or two milkings. The folly of testing milk before a cow has become accustomed to her new surroundings is clear.

Effect on Milk Flow of a Change of Quarters.—The station herd, having been driven three and a half miles to a new barn, gave the two days following as compared with the two days before the change; 6.5 per cent. more milk solids. The general yield bettered, the general quality lowered.

Effect of Abortion on the Milk Yield.—Abortion in the station herd ceased after thorough disinfection with sulphur and plentiful injections of laudanum. There is no conclusive proof that this procedure led to the cessation of the disease. Two different studies with four and six cows led to the statement that abortion entailed: (a) A shrinkage of one-third of the milk yield; (b) a gain of one-tenth in quality; (c) a shrinkage of nearly one-third in butter yield; (d) a more even quality of milk throughout the milking period.

Effect of Weather on Milk Flow.—Five tests, covering practically the whole year, and the conditions of pasture, summer soiling and winter barn feeding, pointed directly to the conclusion that the tendency of cows is to give from day to day richer milk when the temperature falls and poorer milk as it rises; or, in other words, the quality of milk (solids and fat) tends to vary inversely to temperature changes.

Miscellaneous Notes on Butter-Making.

Buttermilks from cream churned at 57° deg. F. contained 0.4 per cent. fat; at 67° deg. F., 0.52 per cent. fat. A buttermilk drawn from butter granules were very fine tested 0.77 per cent.; when churned to large grains, 0.74 per cent. fat. The initial and final quarts drawn from one churning showed identical tests. Skim-milk drawn from deep setting cans far from and near to cream line showed 0.41 and 0.59 per cent. fat respectively.

Churnings of mixed sweet and ripened creams as compared with separate churnings of each afforded results indicating that in the mixed product each lot of cream churned as if it were churned alone, the resulting loss in the butter-milk being an intermediate. The mixing just before churning of creams of different degrees of ripeness entails loss.

Adding 0.10 per cent. caustic soda to milk hindered creaming and churning and injured the butter.

It is safe to skim deep setting cans down very close to the cream, if carefully done. The middle of the can furnishes average quality of skim-milk.

The milk serum is not influenced by the separator. The only difference between whole milk and the skim-milk derived from it is in the amount of fat it contains.

The skim-milk from a rich milk is usually richer in solids-not-fat than is that from a thin milk.

THICKENING UP A THIN STAND OF LUCERNE.—It is sometimes possible and advisable to thicken up a thin stand of newly seeded lucerne by re-seeding. This may best be accomplished by harrowing early in the spring the field which was seeded the previous fall or spring, sowing a little seed, and covering it with the harrow. The earlier this work can be done the better. The difficulty in starting new plants among the elder ones is that the plants which are well started will exhaust the soil moisture and plant food and shade the younger, more feeble plants, often destroying them, especially if a period of dry, unfavourable weather should occur. It is not advisable or practicable to attempt to thicken up a thin stand of lucerne on an old field, since the younger plants, even if they can be started, will hardly survive the season in competition with the old, well-established plants. The old field which has become weedy or full of grass had best be broken and rotated with corn [maize] or other crops for a year or so before re-seeding. In fact, the preferable plan is to seed down other fields, using the lucerne in rotation with corn and other crops, rather than to attempt to keep the same fields in alfalfa continuously.—A. M. TenEyck, Kansas Agricultural Experiment Station.

Agricultural Co-Operation in Germany.

PROGRESS DURING RECENT YEARS.

THE annual general meeting of the Imperial Union (*Reichsverband*) of German Agricultural Co-operative Societies was held last July at Maintz, when the twenty-fifth anniversary of the foundation of the Union was also celebrated. There were nearly 2,000 delegates present.

The official address delivered by Dr. Haas, the Director of the *Reichsverband*, as reported by the *Journal* of the Department of Agriculture and Technical Instruction for Ireland, was a valuable and interesting exposition of the history of the Union and of the fundamental principles upon which the work is based.

The organisation in its first year—1883—contained only nine federations and 248 societies, with a total membership of 10,000. To-day, after its amalgamation with the older Raiffeisen Associations, it embraces the grand total of 41 federations, nearly 18,000 societies, and a membership of over 1,500,000. This immense organisation, though it received its first impulse from Raiffeisen and Schulze-Delitsch, is, as the Director pointed out, not the work of one man nor of several men. Its development came, as it was bound to do, from below and not from above, co-operation being essentially impersonal in its nature. The *Reichsverband*, he said, had always pursued a policy of decentralisation, and their first rule of conduct was: "Uniformity in great things, liberty in minor details." The greatest freedom had always been allowed to societies in matters of local administration, but all must be based upon the fundamental principle of organised self-help and solidarity. Dr. Haas dwelt on the moral as well as the material benefits derived from the movement by the rural population and also on the efforts it had cost to teach that population that effective co-operative thought and action must be unselfish thought and action. He dealt with the question of State aid to co-operative organisations, in the shape of subventions and in the shape of credit, which had been made a ground of objection by their opponents. He declared that any State subventions received had been almost exclusively for scientific and propagandist purposes, and only in a few isolated instances had they been applied to defraying the administrative expenses of co-operative organisations, while the credit given by Government banks was not given gratis (though the rate of interest was moderate) and was only equivalent to the advantages given to industry and commerce by State financial institutions. The application of State funds to the promotion of national prosperity through agricultural co-operation he regarded as perfectly legitimate and justifiable. The

ultimate aim of co-operators was independence of all external aid, but State aid had made the rapid extension of agricultural co-operation in all parts of the Empire possible. It would be many years before they could do without it. They were thankful for it, and were able to accept it without derogation to the character of their movement as one essentially founded on self-help. The great Steamship Companies and other industrial and commercial interests received State aid in various forms, and co-operative agriculture was not ashamed of doing the same. Another principle to which the *Reichsverband* had always clung was that the organisation must ever remain a neutral platform on which party politics and religious differences should never find a place; and this rule, Dr. Haas declared, would be adhered to for all time.

DEVELOPMENT OF THE CO-OPERATIVE MOVEMENT.

The following figures, taken from the *Journal* of the Irish Department of Agriculture, indicate the growth of the agricultural movement in Germany within recent years:—

The number of agricultural co-operative societies in existence in each of the years 1904-1908 inclusive was—

In 1904	18,309 societies;
„ 1905	19,323 „
„ 1906	20,128 „
„ 1907	20,973 „
„ 1908	21,959 „

—the average annual increase in the number of societies thus being 900.

The total for 1908 is made up, as follows: Credit societies, 14,675; agricultural societies, 2,128; creamery societies, 3,132; various societies, 2,014.

The mutual purchase and use of agricultural machinery is an important branch of co-operative activity and special societies are formed for this purpose. In 1908 the number of such societies in the *Reichsverband* was 223. These were chiefly threshing machine societies, which numbered 185. There were also 10 steam plough societies, and 28 other machine societies. The number of special co-operative machinery societies, however, by no means indicate the number of co-operatively owned agricultural machinery in Germany. In Bavaria alone, in 1902, over 3,000 machines were in co-operative use; these included 683 threshing machines in which 16,052 members had a share.

The working capital of the special co-operative machine societies amounted to £78,341 for 101 societies.

The *Reichsverband* also comprises 46 co-operative electricity supply societies, which provide electricity to their members for light and motive power. In 1906 the 15 electrical societies then in the *Reichsverband* had a working capital of £29,227.

The Meat Industry in Hungary.

By LOUDON M. DOUGLAS,

Lecturer on the Meat Industry, Edinburgh.

SOME time ago a party of English agricultural writers, of whom I had the pleasure of being a member, were invited by His Excellency Mr. Ignatius Daranyi, Minister of Agriculture in Hungary, to visit that country and see its developments, so that they could report through their journals to the English people in how far Hungary had adopted modern ideas in connection with agriculture.

The party arrived at Buda-Pest on September 14th, and left there on September 27th, and during the interval they had the opportunity of seeing the greater part of Hungary. This was no light undertaking, as the Kingdom of Hungary covers an area of some 125,430 square miles, or just 4,000 square miles larger than that of the United Kingdom. With a strong desire, however, to show the visitors everything possible within such a limited period, the arrangements had been made so that scarcely an hour was lost, and there was something fresh to see all the time.

The journey began really at Buda-Pest, in examining some of the notable institutions of that great modern city, and extended through Lake Balaton, where the fishery of that great inland sea was duly examined, as well as the beautiful vineyards which surround its shores. On the 17th of September the party journeyed to Komarom, where they had an opportunity of seeing a large Farmers' School, and also a farm conducted by the Minister of Agriculture and which is known as Dunaors, and where in the unavoidable absence of his Excellency, the party were sumptuously entertained by his brother. From Dunaors they went on to Kisber, where the greatest hospitality was also extended to everyone.

Kisber is one of a number of State stud farms conducted by the Hungarian Government, and where horses are bred for home requirements and also for export. The various farms are Kisber, Babolna, Mezőhegyes, Forgaras, and Palanka. These farms contribute amongst them to a really gigantic horse-breeding industry, which is one of the greatest resources of agriculture in the country, and the importance of which may be judged from the fact that horses to the value of £1,166,000 sterling, or thereby, are exported every year.

The cattle of the country present quite different types from those in Western Europe, and the long-horned Hungarian breed is of quite peculiar interest. These cattle are, for the most part, used for draught oxen, as it is quite an unusual thing to use horses for draught purposes. Of late years there has been an attempt made to foster the breed of heavy horses for work on the farms, but very little impression has been made

upon the numbers of cattle used for work. The cattle in the country are divided up into the native Hungarian and imported breeds, and the latter consist of Simmenthaler, Pinzgauer, and Algauer breeds, all of Swiss origin, and they are principally to be found in the elevated and mountainous districts; whereas the white Hungarian cattle are generally found in the Great Hungarian Plain. Hungarian cattle form 22 per cent. of the total numbers in the country, and the others mentioned amount to 78 per cent.

The object in view in cultivating the Swiss breeds is, of course, the production of milk and butter. Unfortunately, however, the production of butter has been sadly neglected in Hungary, and the business is only now being formed into a definite industry by itself. It is quite possible that in a few years' time Hungary may become, as it is entitled to, a very large export butter area.

The Great Hungarian Plain, which is right in the centre of the centre of the country and occupies one-third of its total area, is one continuously level surface, and is devoted to various systems of agriculture, but the fact that long droughts are common has an extremely deterring effect upon agricultural progress. On the hills all round about the plain, and which form a kind of fringe on the frontier of the country, wine growing is conducted to an enormous extent. So much so indeed, that it forms the staple industry of the mountainous districts.

Of crops, the principal is that of wheat, which forms 30.61 per cent. of the total agricultural yield. Next to that is maize, which forms 21.57 per cent., and next again is that of oats, forming 9.00 per cent. Agricultural products such as barley, potatoes, tobacco, and other crops are not cultivated to any great extent.

The number of swine in the country is returned at about 5,000,000, and these, for the most part, consist of the Mangalicza breed, and which is only one step removed from the wild boar. The Mangalicza pig is a coarse, long haired, ungainly looking animal, and contains about five inches of fat along the back, so that for ordinary purposes to which pigs are put, namely, for bacon curing, this breed is of very little use. It appears, however, that the fat is largely used to replace butter in Hungary, and, in consequence, the perpetuation of this race of swine continues. A year or two ago the Department of Agriculture introduced some 1,200 pigs from England into the country, and these were mostly of the Yorkshire breed. These English pigs have been distributed in various parts of the country, and the results are visible in some districts already. It is hoped that this is only a beginning of an alteration in the breed of pigs, which will ultimately result in their character being entirely changed, and should this be accomplished, there is very little doubt but that Hungary will become a bacon-curing country, as it seems specially adapted to the growing of pigs.

The capital of Hungary is Buda-Pest, and naturally one would expect to find there the most up-to-date markets and abattoirs, and it may be said at once that in these matters Hungary is second to no other country. The markets and abattoirs of Buda-Pest are modern institutions, and they are designed on quite modern lines. In the markets it is noticeable that the cuts of meat are entirely different from any obtained in Western Europe. It is also noticeable that quantities of pork are on sale which are not Hungarian at all, but which, we find, come on a long journey from Servia. It is rather remarkable that this pork arrives in first class condition, and this is due to the fact that it is conveyed in railway wagons fitted as refrigerator cars. The meat itself registers 42 degrees F. and, of course, at that temperature, would keep for a much longer period than seven days. The average price of the whole carcass of a pig, weighing net 180 lbs., is 5d. a lb., so that it cannot be looked upon as being very cheap. Beef and veal are sold at about the same prices as are realised in Smithfield Market.

One of the places of interest visited by the party in Buda-Pest was the abattoirs. These are located just outside the city and are three in number, consisting of the pig abattoir, the horse abattoir, and the cattle and small animals abattoir, and, along with the cattle markets are all enclosed in an area of 50,000 acres set aside for the purpose. In the pig abattoir the number of animals to be handled per day seems to average about 1,000, and all those that were passed for slaughter on the occasion of our visit belonged to the Mangalicza breed. As they are brought into the abattoir yards they are stamped with a number which not only shows on the hair, but it also punctured on to the skin by the number being formed of a number of needle points. These points are, along with the surrounding stamp, pressed upon a pad containing violet marking ink and the impression is made on each animal as it passes—the number used being that of the owner. By this means he can trace his pigs right through the abattoir, as the impression on the skin remains.

All the pigs were very heavy, and the average weight would be 20 stone, or about 280 lbs. dead weight. The slaughtering is not quite so humanely carried out as one would wish, the animals not being stunned, as is now common in most up-to-date abattoirs, nor are they hoisted up to a tract bar to be bled. In so far as the furnishing of the abattoir is concerned, the methods of handling the pigs are pretty much in conformity with our own ideas; the cooling and handling being similar to what we are used to. The cutting up, however, was totally different, and this was due partly to the large blocks of fat which were cut off from each carcass, and which were handled in large pieces. It appears that great numbers of these pieces are salted, there being quite a demand for salted fat. The curing of the meat takes place in the abattoir, and the wet process is the one carried out, but as curing is entirely a primitive

matter in Hungary, it would not compare with the methods of nations which have specialised this department of agriculture. It is noticeable that the number of condemned carcasses amounted only to $1\frac{1}{2}$ per cent. of the whole, and these were paid for out of a common insurance fund, to which every slaughterer of pigs contributed 10d. a pig. The handling of the residues is conducted by a society composed of the pork purveyors of Buda-Pest, and they charge for every pig that is slaughtered the sum of 1s. 8d., and retain the offals entirely. At the end of the financial year the profits derived from the offals are divided *pro rata*, and, as a consequence, the business is conducted in a very satisfactory way to all concerned. It is a system of co-operation which is well worth imitating.

In the horse abattoir some 5,000 horses are handled every year, but these are not specially bred for the purpose of food. The horses are those which have to be destroyed for some fault, and the flesh is sold to poorer people in various forms.

The cattle abattoir is a combination of the booth system and the large hall, so that each slaughterer may have a room for himself if he prefers it, and cares to pay for it. The handling of the carcasses, however, is practically the same as in other countries, with this exception that the animals are not stunned, and this particular feature of the business did not commend itself to any of the visitors. The same system of insurance pertains in all the abattoirs, and each animal had to contribute to the common fund.

The cattle mostly seen in the abattoirs were those of the Hungarian breed, and it appeared that they were drawn from the plains after having been draught oxen for some years—there was no rule as to age. They were tall and coarse-looking animals, and range from 16 to 17 hands high at the shoulder. The live weight of many is about 28 to 30 cwt. It will therefore be seen that the proportions of weight and size are far beyond anything we are familiar with.

The system of meat inspection is very complete, there being veterinary officers at the abattoirs who not only inspect the animals alive, but pass the carcasses after they are slaughtered. The same system obtains throughout the whole of Hungary as in Buda-Pest. It appears that every community which has a demand for a large quantity of meat is compelled to erect a slaughter-house in conformity with certain sanitary and veterinary requirements. As a consequence up-to-date abattoirs exist throughout the whole country, and these are under the inspection of qualified veterinary officers. Lately there has been a movement to carry the business of abattoir reform a step further, and in some places an apparatus has been erected for the utilisation of the condemned carcasses, so that what is absolutely offensive may be reduced to an innocuous powder within the abattoir gates, and what may be sold freely in the cooked condition is also placed at the disposal of the poorer portion of the public.

On the whole, the visitors were highly impressed with the manner in which the meat trade is conducted in Hungary, and they were gratified to see that in this direction, as in many others, the Hungarian people were well abreast of modern progress.

In so far as the comforts of the journey were concerned, words altogether fail in conveying an idea of the unbounded hospitality which the visitors met with everywhere. The journey was organised by Mr. Nemeth, of the Department of Agriculture, in conjunction with Mr. Rakosi, of the Otthon Club, and these gentlemen were ably assisted by Mr. Pal Bakonyi, who accompanied the party throughout. Many others assisted and contributed in every possible way to the comfort and pleasure of the visitors, who will long retain grateful recollections of the many kindnesses offered to them in Hungary.

THE DAIRY INDUSTRY IN QUEENSLAND.—The giant strides the dairying industry is making in Queensland may be gauged by the value of butter exports during the past five years. In 1903 the item was worth £49,804; 1904, £344,943; 1905, £455,863; 1906, £582,326; and 1907, £503,582. There are 13,291 establishments in the Colony engaged in the industry. Of these 1,329 handle milk only, 3,190 are cream extractors, and 8,772 make butter. The quantity of milk handled in 1907 was 60,895,502 gallons, 52,623,129 gallons of which was devoted to the production of butter, 2,666,283 gallons to cheese, and 5,609,090 gallons otherwise consumed, mostly for domestic purposes: Of the 22,789,158 lbs. of butter produced, factories made 20,828,080 lbs., or 91 per cent. The total output showed a slight increase of 42,656 lbs. over the figures for 1906. Although the 1907 season was slightly less favourable than that of 1906, the expansion of the butter industry has been remarkable, especially as regards export. From the figures already quoted, it will be seen that the quantity of butter exported has multiplied some seven or eight times within the past five years. The money now introduced into Queensland in return for butter sent away amounts to upwards of £500,000 each year, and will in all probability be greatly increased at an early date in view of the excellent position now occupied by the Queensland product on the London market. This has been brought about by the system of grading and marking recently introduced under the supervision of the Department of Agriculture. The average declared value of all butter shipped last year was 10d. per lb., the same as in the previous year, but a marked advance on 1904-5 values.

Stripping Sugar Cane.

IS IT ADVISABLE?

IN Formosa a peculiar custom of stripping sugar cane has prevailed from a very early period, which, whatever reason be given for it, has resulted in benefit to the plants. One species, Scarlet Cane (so called from its colour) always has its dead leaves stripped a week or two before cutting begins, so as to give a fair appearance of colour to the stalk, and others, such as the "Waxy Cane" and "Bamboo Cane," the natives treat in the same way, with the object of obtaining fuel; but there lies no scientific purpose behind the practice. Planters in Formosa and elsewhere are in favour of the constant removal of all dead leaves for the following reasons:—That the cane ripens earlier and acquires a depth of colour; that such a proceeding deprives noxious insects of a breeding ground; that the cane is provided with the necessary circulation of air and light in and around it; that the withered leaves so removed cover the soil, and so check undue evaporation of moisture, thus benefiting the canes; and that the expense thus incurred in stripping may be more than covered by an increased output of cane.

Some experiments were carried out lately by Mr. T. Murakami, B.Sc., of Formosa, with a view to investigating this problem of stripping, and in an article in a recent issue of the *International Sugar Journal* Mr. Murakami describes his experiments and the results obtained. Each variety plot was divided into two parts, and from one of them all the dead leaves were twice carefully stripped off at intervals of a month, while the other was left untouched, both being subject to the same conditions of cultivation. At the beginning of the milling season, in December, each plot was cut, weighed carefully and the products analysed.

The effects of stripping on the various species, as compared with the unstripped plots, are summarised by the author as follows:—

(1) In each variety of cane the size of stalk was remarkably increased.

(2) With the exception of the *Ancha* (Scarlet Cane) and the *Striped Singapore*, both of them scarlet in colour, the cane stalks were found to be standing much more erect.

(3) In all the varieties except the two Formosan species *Tekucha* (Bamboo Cane) and *Ancha* and probably the *Striped Singapore* (all of which are hard-rind canes), the water content and the rate of absorption of mineral salts were greatly increased and in the juice the purity coefficient was noticeably lowered.

(4) But less sucrose and more glucose are found contained in the juice from stripped canes, except in the case of the *Ancha* and *Tekucha*, in which the effect seems rather the opposite one.

(5) Fibre and other non-sugar organisms are markedly increased and seem to have influenced a decrease in the content of juice.

(6) *Rocha* (Waxy Cane), *Ancha*, and *Striped Singapore* gave a smaller tonnage, but in the other varieties it was increased by stripping, especially in the case of *Tekucha*, where the difference was considerable.

(7) The amount of available sugar in the cane is greater (excepting *Tekucha*), ranging from 500 to 1,220 *kins* (a *kin* is equivalent to 1.32 lbs.) of sugar per *Cho* (2.45 acres)—or 269 lbs. to 653 lbs. per acre.

EFFECT OF MANURES.

Would different fertilisers alter these results? In the manurial experiment plots, calcium superphosphate as phosphoric acid, ammonium sulphate as nitrogen, and potassium sulphate as potash were carefully applied, each in excessive quantities. Each plot was further sub-divided into two sections, in one of which the cane was constantly stripped and the dead leaves left to cover the ground till the end of the season, while the other section was left untouched.

Upon comparison with the conclusions obtained in the previous experiments (omitting a few minor modifications and irregularities observed in the complete manurial plot from unaccountable reasons which require further investigation) the results as a whole have verified previous conclusions and have furthermore shown that the effect of stripping canes when different manures are applied is felt most largely in those plots in which phosphoric acid is omitted or nitrogen is heavily present. In such cases the largest crops are found when the canes are stripped; and the least when no potash manure is present. But, on the other hand, the loss of available sugar is surprisingly great.

From another experiment it was found that the juice did not deteriorate much from the retention of the dry leaves but that on the contrary the purity coefficient, sucrose, and consequently available sugar were slightly increased.

CONCLUSIONS.

It may be thought unwise and unscientific, Mr. Murakami remarks, to draw general conclusions from only partial investigations carried out in Formosa, which island may differ somewhat in climatic conditions and methods of cultivation from other sugar-producing countries; yet the results thus far might be of some interest and value to the sugar industry as to be worth recapitulating. The conclusions of these experiments are therefore given as follows:—

(1) The decrease in sucrose and the lowering of the purity coefficient and the simultaneous increase in glucose and fibre in the imported canes

when stripped may be interpreted as due to a chemical activity having taken place, non-sucrose having been transformed into sucrose and sucrose into glucose.

(2) This chemical activity may be influenced in the presence of a large amount of salt absorbed along with water.

(2) The fresh food material thus obtained is expended in the growth of the canes, an increase in their weight and size, but strange to say the coloured canes for some mysterious reason are exceptions to this supposition.

(4) A long exposure to the hot sun causes the rind or peel of the stalk to become much harder, especially around the joints, thus increasing the fibre content. This is not, however, the case in the Formosa varieties and the *Striped Singapore*, all of which are rather hard in rind and thus resist the absorption of water and salt when the canes are stripped and brought to maturity.

(5) The different kinds of manures do not alter these conclusions except in minor cases chiefly concerned with the nitrogen plot and the complete manure plot.

(6) The juice obtained from all canes from which the dry leaves are not stripped is not inferior in its quality, but on the contrary has a slightly increased sucrose content and coefficient of purity.

Highest efficiency and best civilisation are reached by a community when each individual thereof has the largest range of abilities to meet wants and the largest range of wants to be met.

TAINTS IN BUTTER.—Dirt is often the cause of bad-flavoured butter; but there are certain weeds which grow in the fields, which cows eat, and cause a vile flavour in the milk, and subsequently in the cream and butter. The chief of these are wild garlic, hemlock, tansy, saffron and wild mint. The cure for the first cause mentioned lies in its removal by plenty of "elbow grease" and keeping all utensils scrupulously clean and sweet. Scalding for half an hour at 180 deg. will rid the cream or milk of the taint caused from the plants mentioned. The most effectual cure, however, for taints of any kind in butter is to place the butter in cold storage for one or two months. At the end of this time all traces of the taint will be completely removed.—*Agricultural Gazette* (London).

A Year Among the Orchards of Nova Scotia.

By CECIL H. HOOPER.

(A Paper Read before the Royal Horticultural Society, London.)

THE Peninsular of Nova Scotia is situated on the east side of the Dominion of Canada, and south of the entrance of the Gulf of St. Lawrence. The climate here is very pleasant, in spite of a long and rather severe winter. The country is remarkably well supplied with water by its countless little springs and its numerous lakes, as well as by the heavy falls of snow in winter and frequent and heavy showers during the summer months, the latter generally falling at night, leaving the days bright, warm and cloudless. The scenery is beautiful, the abundance of native trees rendering it particularly attractive; the most common of these are spruce, fir, pine, larch, birch, maple, ash, alder and oak. The acacia tree is often seen, and also in some parts the French willow and English elm have been introduced, and thrive well. Nova Scotia is said to have the largest variety of flowers, mosses and ferns of any country; wild eatable berries are also very plentiful; they include strawberries, raspberries, blueberries, huckleberries, blackberries and cranberries.

THE CORNWALLIS AND ANNAPOLIS VALLEY.

The Cornwallis and Annapolis Valley is the principal fruit-growing district in Nova Scotia.* It is one continuous valley of about 100 miles in length, and varying in width from 6 to 11 miles, situated between two nearly parallel ranges of hills about 600 feet in height. The North Mountain shelters the valley on the north-west, and from the strong winds off the Bay of Fundy; the South Mountain, which is a little higher, bounds it on the eastern and southern side, and runs N.E. to S.W. In the middle of the valley there is a watershed, the Annapolis River running S.W., the rivers of the Cornwallis District running N.E.

These rivers are small, but owing to the great rise and fall of the tide (60 feet) the salt water runs up far inland, carrying with it enormous deposits of alluvial mud or silt, and allowing ships to go several miles inland.

Near the mouths of the rivers are salt marshes which are overflowed by the tide and grow salt hay, which is eaten by the cattle during

* The fruit belt is however being extended, as owing to the establishment of experimental orchards by the Nova Scotia Government, it has been found that apples can be successfully cultivated in practically any part of the Province.

winter. Higher up are the dyked marsh lands reclaimed from the sea, forming very rich meadow land. Grand Pre, the district rendered famous by the expulsion of the Acadians, lies in the eastern part of the valley, on the shores of the Basin of Minas, across which Cape Blomidon, the termination of the North Mountain, is clearly seen. Owing to the beauty of the country, its historic interest, and the cooler temperature, it attracts many visitors from the United States during the summer months. Apples and plums are grown throughout the valley, and in the centre, near the towns of Middleton, Aylesford, and Berwick, cranberries, raspberries, blackberries, and strawberries are grown, also some peaches and a few grapes; one farm I visited had six acres of strawberries. Most of the soft fruits are sent to Halifax and Boston. In the centre of the valley there is a large area of bog land, which, it has been found, is well adapted to cranberry growing. This industry is rapidly increasing.

The greater part of the valley was originally covered by forest, which has been cleared, save at the foot and sides of the mountains.

THE SOIL.

The soil of the valley is partly formed from the disintegration of the Trap Rock of the North Mountain, partly from the syenitic granite of the South Mountain, together with the red loam and coarse-grained sand of the new red sandstone in the valley, which abounds in oxide of iron, lime and gypsum, forming a fertile soil admirably adapted to the cultivation of apples, plums and various fruits, as well as of potatoes, swede turnips, oats, maize, pumpkins, beans, etc. Wheat growing and beef production have lately decreased, owing to the competition of the western provinces, but more attention is now being paid to the rearing of stock by the farmers. The dairying industries are also increasing.

THE FARMS.

The farms are, almost without exception, occupied by their owners, most of them small, compared with the average English farms, and still smaller, of course, compared with many farms in the west of Canada and the United States. The labour is largely performed by the farmer and his sons, with but little hired help. The farmhouses and buildings for the most part are neat, comfortable, and give the impression of prosperity; they are almost all constructed of wood, painted white; they are generally situated near the high road, and, as the farms are frequently long and narrow extending often back into the woods and down through the marsh land to the river, the farmhouses are frequently within a quarter of a mile of one another, which enables life there to be of a social nature if desired. Prohibition of intoxicating drinks is rigidly enforced throughout Nova Scotia, with the exception of a few towns; there is consequently very little drunkenness. Roughly speaking, the

area of these farms varies from 20 to 120 acres, about equal parts of grass and arable land, the latter including one to five acres of apple orchard. There are a few farms with as many as 60 or more acres of orchard; but a large proportion of this has been planted within the last ten years, and is not yet in full bearing. Many orchards are 50 years old, and a few apple trees remain which were planted by the French more than 150 years ago. The apple tree certainly thrives here, and the orchards are generally neatly laid out and well cared for; the growth of the trees is more rapid, and they attain a larger size than is common in England. The fruit is usually large, well coloured and abundant, and of pleasant flavour, particularly the Gravenstein. Owing, I suppose, to quicker growth and shorter season, I do not think the flavour generally is quite as nice at that of our best English apples. Although the shape of the trees, the cultivation and the fruit in the best English orchards equal, I think, anything I saw in this valley, the average of the two countries is much in favour of Nova Scotia.

Throughout the valley there is a telephone system which connects railway stations, shops, doctors' dwellings, and many of the farmers' houses. The charge is five pounds for installation, £2 10s. yearly.

On one occasion I sent a cable to England from the sitting-room of the farmer's house in which I was staying, and received one back.

Co-operative cheese and butter factories stud the valley every few miles. These encourage the keeping of dairy cattle, which industry profitably accompanies fruit-growing. The local agricultural societies own pedigree cattle for the improvement of native stock. At Canning, in the Cornwallis Valley, there is a vegetable evaporating factory (Kerr's), which was busy drying vegetables for the soup of the miners at Klondyke. It has in former years fulfilled contracts to the satisfaction of the English Government for naval and military supplies.

PRUNING AND TRAINING.

The trees are, as a rule, well shaped, as the farmers begin early in the life of the tree to shape them. They like their trees to have a central leader with the main branches distributed evenly about it. The height of the branches from the ground is regulated so as to allow horse cultivation under them.

It is found by experience that it is best to saw off the branches as close against the trunk as possible. If it is necessary to remove a large limb, they commence by sawing in a short distance from below, upward, in order to avoid splitting the wood and tearing the bark. Large wounds grow over best when the edge is smoothed off with a knife and then covered with some substance to exclude moisture, and thereby prevent decay. Gum shellac dissolved in wood-alcohol is found to be the best substance for this purpose, though white lead paint or grafting wax are both good.

Generally speaking, summer pruning, of which a good deal is done, promotes fruitfulness; winter pruning tends more to wood growth. Pruning in Nova Scotia is chiefly done at the end of winter, whilst snow is still on the ground. When the trees are bursting into bloom is found to be a good time, though the opinion is that pruning may be done any time during the winter without disadvantage to the trees, the discomfort being that of the man who prunes.

In case of a tree being split at the forking of the branches, a hole is bored with an auger right through the tree, at right angles to the split, and the parts are drawn together by an iron screw bolt and nut; which damages a tree less than binding together with a hoop of iron.

Again, on Mr. Ralph Eaton's farm (Kentville), in order to train the young trees to grow upright, in case of the trunk bending, a screw-hook is screwed into the tree, and by means of a wire attaching the hook to a peg in the ground, the tree is drawn into the desired position. These hook-eyes and wires are also used to train the branches into correct position where necessary.

FERTILIZING OF ORCHARDS.

Rotation in the fertilizers applied to the orchard is recommended as advantageous. For example: stable manure one year, chemical fertilizer another. Farm-yard manure greatly benefits old, neglected orchards requiring nitrogen; but its use should be discontinued where trees run too much to wood and leaf without fruit, and some fertilizer containing potash and phosphate would probably prove more beneficial.

Green manuring or cover cropping is much employed in Nova Scotia to supply vegetable matter.

In Canada, wood ashes are the best possible manure. They are applied at the rate of twenty to forty bushels per acre; those from hardwood being better than those from fir trees. The ashes contain about five to seven per cent. potash, two per cent. phosphoric acid.

As the available supply of farm-yard manure and wood ashes is very limited, commercial fertilizers are largely used; the two in most common use are finely ground bone meal at the rate of five to eight cwts per acre to supply phosphate and nitrogen, and muriate of potash at one to three cwts. per acre to supply potash.

In the adjoining valley of the Gaspereau there is a bone mill, to which farmers take bones to be ground.

Nitrate of soda is not, from what I noticed, much used in the Nova Scotian orchards, save sometimes to give young or old trees increased vigour. Nitrate of soda at 95 to 96 per cent. purity equals 15.6 to 15.8 per cent. of nitrogen.

In a paper on fertilizers for orchards in Nova Scotia, published in *The Farmers' Advocate*, the following ingredients were recommended:—

For small fruits (strawberries, raspberries), per acre: 150 lbs. nitrate of soda, 250 lbs. muriate of potash, 800 lbs. bone meal.

For apple orchards: 100 lbs. nitrate of soda, 200 lbs. muriate of potash, 550 lbs. bone meal.

For orchards with clover: 200 lbs. muriate of potash, 250 lbs. Thomas phosphate (Basic slag).

E. B. Voorhes, of New Jersey Experimental Station, said:

"To provide vegetable matter and to improve the physical quality of poor soils, apply yard manure once in four years, in fall or winter, at the rate of from five to ten tons per acre. To aid in the decomposition of vegetable matter, and to insure a sufficiency of lime as plant food, apply lime at the rate of twenty-five bushels per acre once in five years. To provide, in addition, an abundance of all forms of available plant food at the times needed for the development of the tree and fruit, apply annually chemical fertilizers in the following proportions:—

Nitrate of soda	100 lb.
South Carolina rock superphosphate	100 lb.
Ground bone	200 lb.
Muriate of potash	200 lb.

"The amounts to be applied depend upon the character of the soils, the kind of fruit and the age and vigour of the tree; these given perhaps mark the minimum. In a number of best orchards the quantities are very much larger than is here indicated, and the larger application is believed by the growers to be proportionately profitable."

Frank T. Shutt, Chief Chemist of the Dominion Experimental Farms, wrote:—

"Assuming the leaves of a full-grown apple tree to weigh 50 lb., and reckoning 40 trees per acre, the manurial value contained in the 2,000 lb. of leaves is equal to—

Nitrogen	17.74 lb.
Phosphoric acid	3.88 lb.
Potash	7.84 lb.

The leaves are returned to the soil, but the fruit is exported. This, in the case of an orchard 25 years old, producing 160 barrels per acre—equal to, say, 20,800 lbs. of apples—there is a loss to the soil of approximately—

Nitrogen	8.9 lb.
Phosphoric acid	5.3 lb.
Potash	32.8 lb.

The following is given as another useful formula for manuring orchards:—

Good rotten barn-yard manure, 10-15 tons per acre.	
Kainit (13 per cent. potash)	300-700 lb.
Or muriate of potash (50 per cent.	
potash)	100-200 lb.
Bone meal (fine ground)	100-200 lb.
(2 to 3 per cent. nitrogen, 22 per cent. phosphoric acid.)	
Or superphosphate	125-250 lb.
(16 per cent. phosphoric acid.)	

ORCHARD TILLAGE.

The apple trees are planted 33 to 40 feet apart; in a few instances with plum trees between, in one direction of the lines.

For the first few years the ground is ploughed deeply (8 inches), in order to break up the soil and encourage the roots to grow down to a sufficient depth to escape injury in the case of drought and to be below the reach of the plough. The whole surface of the orchard is tilled from the beginning. In ploughing the plough is turned partly out when within a few feet of the trees and runs shallower (4 inches deep), as the roots near the butt are closer to the surface; immediately round young trees the surface is generally carefully forked over. Between young trees potatoes are frequently grown, using bone meal and muriate of potash as fertilizer. The deep ploughing needs only to be kept up for a few years in order to establish root growth.

The kind of plough in general use has no wheels, but has a sharp curved mould board, which, although it increases the draft, the difference is more than compensated for by the better condition the soil is left in. The ploughing is done either in the fall or early spring; in Canada fall ploughing is not recommended for clay land as it tends to puddle it and make it become hard and stiff, the frost consequently enters to a greater depth, and root injury may result. In ploughing one aim is to obtain a level surface, thus one year the soil is ploughed from the trees, the next towards them, one year east and west, the following north and south. Most of the farmers whose land run down to the river bank, dig and haul the salt marsh and mud on sleighs during winter and spread it on the orchard land; this is disintegrated by frost and more carefully spread in spring. The mud has a fertilizing value, and also the salt in it probably aids in keeping the land moist. Early tillage saves the moisture accumulated during winter and early spring, and puts the soil into fine condition to warm up and get the trees quickly to work. As thorough cultivation renders plant food available, and is the best conservator of moisture, tillage is begun early by ploughing as soon as the snow has thawed, and the land is sufficiently dry to be worked. Harrowing follows, which stirs the ground thoroughly to the depth of about three inches. This is performed about every two weeks until late in

the summer; the drier the soil the oftener it should be done. The varieties of harrow used include the spring tooth, the spike tooth, the disc and acme. If the wood growth of trees is too luxuriant, it may be checked by lessening the tillage and by withholding nitrogenous manure. As the orchard trees stop growing about midsummer vigorous tillage then ceases, so that the new growth may ripen sufficiently to stand the cold of winter, and as the trees can now spare considerable moisture, catch crops are with advantage sown, such as tares and buckwheat.

(To be continued.)

The Control of the Meat Supply.

LECTURE BY PROF. LOUDON M. DOUGLAS.

THE fourth lecture of the series which is being given by Professor Loudon M. Douglas (whose name is well known to readers of the *Journal*), at the College of Agriculture, Edinburgh, was delivered on December 14th, the subject being the Control of the Meat Supply.

The lecturer stated that there were 51 markets in Great Britain from which returns for live stock were obtained, and it was curious to note that the numbers of animals presented for sale at these various markets did not vary very much from year to year. Thus in the department of fat cattle alone, the figures for 1906 were 1,032,259, whereas in 1907 they were 1,060,066, it will be seen that the variation was not great. The imports, however, from foreign countries had gone up enormously, and it would appear as if our principal source of meat supply as in other foods was not in the United Kingdom itself. A comparative statement of the total meat imports for the last three decades showed more strikingly than it could be presented in any other way how we depend upon foreign sources of supply. In 1887 the value of the meat imports was £14,350,000, in 1897 the value had increased to £26,825,000, and in 1907 this figure had gone up to £42,000,000, figures which showed a rapidity of increase which was truly gigantic. The figures presented a new set of conditions in the meat trade, and the control of meat from foreign countries would require to be undertaken by our authorities as the principal part of their duties as compared with the inspection of the home supplies.

The lecturer described the methods for the handling of meats in

foreign countries, and illustrated by means of lantern slides the methods of transport and meat inspection in Holland, the United States, the United Kingdom, and elsewhere. He also pointed out the importance of the by-products, which were scientifically treated in foreign abattoirs, and the organisation of this branch of the meat industry had still to be done in so far as the United Kingdom is concerned.

There were three people primarily concerned in the meat supply, namely, the farmer, the meat purveyor, and the consumer. The farmer was the producer of the raw material and was entitled to produce live stock which were free from disease. The principal disease to be dealt with was that of tuberculosis, and there was no doubt that it was perpetuated to some extent in the United Kingdom, because pedigree stock-owners were obliged to test all pedigree stock intended for shipment abroad. Should such stock react to the tuberculin test, the animals were not slaughtered, but were distributed throughout the home herds, thus perpetuating the disease. This was a matter for State intervention, and nothing short of that would effect a cure.

The meat purveyor occupied the position of being the middle man between the farmer and the consumer, and he certainly did not wish to buy tuberculous meat. He was in this position that he could not make use of any ready test which could be applied to cattle in the market place so as to demonstrate whether they were disease free or otherwise. He paid his money with the intention of buying sound animals, and it was unfair that should they turn out to be otherwise he should be at the loss.

The consumer undoubtedly was to be protected both against the farmer and the meat purveyor, and hence our system of veterinary meat inspection, which was being gradually extended.

The various laws governing the meat control in Great Britain were then referred to, as were also the new regulations controlling foreign meats at British ports, and the lecturer pointed out how absurd it was that such regulations should be carried out under the Medical Officer of Health, who was totally unqualified for such an office; the examination of meat was the business of veterinary inspectors, and they only should be appointed to carry out such inspection.

Labour is divisible into *operative*, *executive*, and *speculative* labour. Examples of these three categories are, bricklayer, foreman, and architect, respectively. A farmer combines all three categories.

Rubber v. Bark.

A NEW PROCESS FOR TANNING LEATHER.

WE have received, from the Commercial Agent for Natal in London (Mr. Francis Harrison), information respecting a new process which has been invented and patented lately for permeating hides and skins with pure rubber, which it is claimed produces a superior article to bark-tanned leather. It has long been recognised that an immense market would be open for rubber-tanned leather, if only a perfect product could be obtained: but the satisfactory tanning of leather by means of rubber has for many years been regarded as a practical impossibility. The Rubber Tanning Syndicate, Ltd., of Finsbury Pavement House, London, however, considers that the problem has now been satisfactorily solved, as a result of many years of experiment, and we learn that patents have been granted in Great Britain, United States, Canada, Mexico, Argentine, France, Russia, Belgium, Austria, Hungary, Japan, India, Norway, Sweden, Denmark, Italy, Spain, Transvaal, Cape Colony, Australia, and New Zealand.

WHAT RUBBER-TANNING MEANS.

The invention consists of a process for permeating hides and skins with pure rubber, the result being what is known as rubber-tanned leather, which is said to possess qualities vastly superior to those of the ordinary bark-tanned leather. Increased life, resiliency, durability, toughness, pliability, softness and water-resisting qualities are imparted in the rubber-tanning process, giving a commercial value to the new product far beyond that of any leather at present known to the market.

In the preparation of ordinary bark-tanned leather the cells of the hide or skin are filled with chemicals, oils and other substances that add considerably to its weight, while the harmful effects produced outweigh any advantages claimed for the process, a rigidity being given to the leather which only remains so long as it is kept dry and in no sense does it become waterproof. In rubber-tanned leather the effect produced is almost entirely the reverse, the principle involved being to cleanse the pores of the skin and to extract therefrom all foreign and superfluous fatty matter, so that the cells may become available for the absorption of the rubber. The result is the production of a material which is practically waterproof, and which, while far more durable than the ordinary commercial leather, is at the same time soft and pliable, qualities which remain one of its distinguishing features even after immersion for lengthened periods in water, and render it available for

the manufacture of many articles for which ordinary leather is wholly unsuitable or unsatisfactory.

SOME OF THE ADVANTAGES CLAIMED.

Leather thus treated has been abundantly tested and proved and is suitable for the manufacture of many articles of domestic and commercial use. The toughness and durability, softness and water-resisting qualities which are essential in most of these articles are attained by rubber-tanning; and we understand that the leather can be dyed to any of the colours that are most used. Weight, so detrimental to the essentials of the product, is avoided, whilst a much greater superficial area, weight for weight—a most important consideration for buyers in bulk—is obtained, rubber-tanned leather in most cases giving almost double area, pound for pound, as compared with ordinary bark-tanned leather, whilst its durability is enormously increased.

Another advantage claimed is the toughening and strengthening of sheep skins and the poorer portions of bullocks' hides, such as the flank, neck and shoulders. The pores of these parts of the skin being large, the rubber penetrates more freely and enables such parts, which at present detract from the value of the skin, to be utilised by reason of the increased strength and substance given to them by this process. Such poorer portions of hides and skins are, in fact, rendered by the rubber-tanning process as durable as the best portions of bark-tanned leather, and their value very largely increased.

An important factor in the case of rubber-tanned leather, as compared with bark-tanned leather, is the very short period of time required to produce the former, the result being that there is no locking up for lengthy periods, as in the case of bark-tanned leather, of large amounts of capital represented by stocks in process; while bark-tanning requires anything from 5 to 12 months, the rubber-tanning process occupies at the outside from 5 to 7 weeks only.

A MATTER TO BE WATCHED.

Such is the principle of the process and such are the chief advantages claimed for rubber-tanned as compared with bark-tanned leather. This is a matter which very evidently concerns wattle-growers, since, if a large company is formed, as the inventors of the process hope will be the case, the consumption of wattle bark will be more or less adversely affected in the years to come. Mr. Harrison accordingly intends keeping the Colony informed as to what progress is made in the flotation of a company and the manufacture of rubber-tanned leather on a commercial scale; but for the present he states, as pointed out by the Director of the Imperial Institute—with whom he has been in correspondence on the subject—that the matter is only in the initial stage at present and that it would consequently be premature to take any action in Natal.

Export of Apples.

AMERICAN AND AUSTRALIAN METHODS.

IN a note in our last issue we referred to the possibilities which the Colony possesses in the direction of building up an export trade in apples, and we gave lists of the chief varieties which are shipped to England from Tasmania and Australia, the information having been furnished by the Commercial Agent (Mr. Francis Harrison). Mr. Harrison has now sent some further interesting details regarding the export of apples from Canada, the United States, Australia and Tasmania, together with useful information regarding the British markets, prices realised thereon, etc.

CHIEF VARIETIES SHIPPED TO ENGLAND.

Mr. Harrison first gives us lists of the chief varieties shipped from the principal exporting countries mentioned above, indicating the varieties which find most favour in the British markets. They are as follows:—

From Canada.—Rome Beauty, Salome, Ribston Pippin, King of Tompkins County*, Wealthy, Grimes Golden Pippin*, Spitzenburg*, Jonathan*, Baldwin*, Northern Spy*, Newton Pippin*, Nonsuch, Nonpareil, Stark*, Russet, Golden Russet* (must not be coarse), Greening*, Ben Davis (not recommended), Belle Flem (not recommended), Blenheim*. The varieties marked with an asterisk are the favourites on the British market for quality, sale, and good carrying properties.

From Tasmania, S. Australia, and Victoria.—Ribston Pippin*, London Pippin, Strawberry Pippin, Cox's Orange Pippin*, New York Pippin, Sturmer, French Crab, Adam Pearmain*, Scarlet Pearmain, Scarlet Nonpareil*, Wellington*, Blenheim*, Cleopatra*, Rome Beauty, Jonathan*, Bismark, Dunn's Seedling*, Monroe's Favourite*. All these varieties carry well: those recommended for best sale are marked with an asterisk.

United States.—From California and Oregon: Newton Pippin. From Washington State (now entering the market): Winter Banana, Baldwin, Jonathan, Spitzenburg, Arkansas Black, Delicious, Hoover, Winesap, Northern Spy, Delaware Red.

VARIETIES RECOMMENDED.

If a smaller selection of the varieties marked as especially suitable for export be desired, it is recommended that for good carrying, prices, and free demand, the following may be grown with safety:—Newton Pippin, Cox's Orange Pippin, Jonathan, Baldwin, Cleopatra and Spitzenburg.

PRICES.

The following statement supplied by the Commercial Agent gives an idea of the range of prices during the season:—

Nova Scotia and Ontario: per barrel of about 3 bushels—10s. to 21s.

British Columbia: per box of one bushel—6s. to 12s.

Tasmania and Australia: per box of one bushel—6s. to 11s.

U.S.A. (California and Oregon): per box of one bushel—6s. to 14s.; per barrel of about 3 bushels—10s. to 21s.

U.S.A. (Washington State): per box of one bushel—8s. to 15s.

The apple industry in Canada and U.S.A. is being very greatly extended, and with the larger export expected in the future prices will automatically decline, but not unremuneratively.

GRADING AND PACKING.

The grades and packages in use are as follows:—

Nova Scotia and Ontario.—In barrels with 120 to 140 lbs. of apples—approximately three bushels. Two grades.

British Columbia.—In standard bushel box defined by Act: 10 inches deep by 11 inches wide and 20 inches long. Packed in tiers, $3\frac{1}{2}$, 4, and $4\frac{1}{2}$, according to size, and containing 40 to 45 lbs. apples or 60 to 130 fruits.

U.S.A.—In barrels and boxes. Similar grading and packing to foregoing.

Tasmania and Australia.—In boxes only: 15 inches deep by 10 inches wide and 20 inches long. Graded. Medium-sized apples only exported.

Barrels, where used, are becoming obsolete, boxes taking their place, except for commoner qualities.

Methods of Picking and Packing.

Mr. Harrison sends the following hints which he has gleaned from authorities:—

Use a ladder fairly broad at base narrowing to a point. Use a basket round in shape with swing handle holding little more than a peck. Empty the fruit *gently* into barrels and remove to sorting shed. Pour apples on to a table, say, 5 feet long by 3 feet wide with ledge all round, 4 to 5 inches high, covered with felt or sacking.

Sort into grades required. Then invert the box so that the packing commences *from the top*. Line the box with thin, white paper, place a layer of corrugated paper in the bottom (or the top, as it will be when finished), wrap each apple in paper, and place evenly and *firmly* in rows. When one tier is finished place a layer of thick board paper, and so on until the last tier, then put a layer of corrugated paper and nail down the bottom. By adopting this method, which has been well proved, bruising will be prevented. Some packers even place the corrugated paper around the sides as well.

Girls are employed as packers in Ontario and each packs as many as 80 boxes in a day of ten hours.

Wood Used for Boxes, and Branding.

The Tasmanian cases are made of well-seasoned Eucalyptus wood somewhat roughly made but strong and true to size. The sides are frequently made of two pieces of wood with a one-inch air space in the middle.

The ends of the boxes require to be marked clearly with the brand of the shipper, his initials or name, and the variety and number of tiers of his fruit—either by label pasted on or by being burnt into the wood.

Temperature at Which Carried.

Canadian and United States apples are carried at a temperature of from 32 degrees to 40 degrees; Tasmanian apples at about 40 degrees.

It is recommended, as the result of long experience, that an *even* temperature should be maintained, and that on no account should it be allowed to drop below freezing point or go above 40 degrees. *Nothing is worse for apples than variations of temperature.* Thirty-four degrees is a very good temperature to adopt.

If the apples are long in transit by rail in hot weather, refrigeration vans are used at a temperature corresponding to that in the boat—say, 33 to 35 degrees.

The Californian and British Columbian apples travel some 6,000 miles from the packing house to the British market.

MISCELLANEOUS NOTES.

The chief markets in the United Kingdom are London, Liverpool, Manchester and Glasgow.

Canada and the United States export from the end of September to March; Tasmania and Australia from the beginning of April till the end of June; England from the end of July to January.

CO-OPERATIVE ASSOCIATIONS.—Recent years have witnessed an active movement on the part of growers in Ontario, Canada, in the direction of organisation for the packing and marketing of their fruit. This movement has been particularly effective in increasing the profits derived by the ordinary farmer, who is not a fruit-grower, from his apple orchard. About thirty such associations exist in the Province. The members deliver their apples to a central packing house, where they are packed and disposed of and the profits divided. Where associations exist farmers are taking a much greater interest in orchard management, the possibilities of profit, where the crop is handled collectively instead of by the individual, having been demonstrated. Spraying materials, barrels, packages, etc., are purchased at wholesale rates through the association, and better terms are made for disposing of the output.

Stock Branding in South Africa.

A PLEA FOR A UNIFORM SYSTEM.

THE Inspector of Brands of the Transvaal (Mr. J. J. Pienaar) delivered an interesting lecture at the recent Congress of the Inter-Colonial Agricultural Union, on "A South African Uniform System of Branding." In the course of his lecture he said that his main object in putting this matter before them was to point out the necessity of unification in matters pertaining to this particular branch of the animal industry, and, as there was no capital concerned in this unification scheme, he anticipated no difficulty.

An inter-colonial system of branding was a new departure in the agricultural history of South Africa, and, as they were aware, innovations in South Africa were always scrutinised with intense suspicion, but in this matter he feared neither suspicion nor criticism; for co-operation in this direction was something tangible to strive for. Much time was devoted to this subject, and he entertained most sanguine expectations that if the present system be adopted throughout South Africa, it would meet the views and command the support of every stock-farmer. If it was intended that the branding laws of South Africa should have the desired effect, then they should no longer remain isolated, but reciprocally aid each other in the recovery of lost or stolen stock and the discovery of stock thieves. Their first duty was to endeavour to prevent the allocation of identical brands by the five States concerned; for if each State registered brands without having regard to the brands allotted by its sister States it naturally followed that at least five owners throughout South Africa would have identical brands, and this practice would lead to endless confusion and give rise to so many difficulties, that, although registered, a brand would lose its importance. They wanted to increase the advantages of branding, not to destroy them. Some young folk were of opinion that since their forefathers taught the savages of South Africa the law of equity, they were no longer exposed to the dangers of stock theft, but arguments like those fell to the ground when they considered that during last year stock to the value of £30,000 was stolen in one of their Colonies—one which had not yet revived from a severe blow. Two-thirds of the stolen stock had, however, been recovered, but one-third, valued about £10,000, was not recovered. He was told by the authorities that the efforts made to recover them were frustrated by difficulties attributable to the fact that most of the animals bore no marks by which they could be readily identified. The native thief was not such a dangerous character, but that new man, who was

familiar with the art of faking brands, etc., was the one against whom they should take decisive action.

After dealing with the history of branding, Mr. Pienaar proceeded to say that the prime object of a branding law was to facilitate identification, and to do this it was necessary to prevent the use of two or more identical brands standing registered in the names of different owners. That meant that when an owner had registered a brand he must be protected in its exclusive use. In this way it facilitated identification and they were placed in a position to trace stray or stolen stock. Promiscuous brands meant that anyone could register what brand he pleased so long as it was not identical in design to one already registered. The result of such haphazard measures was that when the more simple characters had been registered they were saddled with such disfiguring marks as flower-pots, frying-pans, gridirons, etc. The greatest drawback of such a method was that nearly every brand could be faked without the least difficulty on the part of the duffer. For instance, J. Fourie registers J., J. Fraser again registers "J.F." while J. Fouché registered "J.F.1." What is to prevent Fraser from taking Fourie's brand by adding the "F" thereto, and thus make it "J.F." Fraser's registered brand. Fouché again if dishonest could steal cattle from both Fourie and Fraser, and by adding "F. 1" to Fourie's brand and the numeral 1 to Fraser's brand, the animals would bear Fouché's brand, J.F. 1. The greatest danger, however, was the frying-pan and gridiron. The owner of such a brand simply placed it over the brand of another owner with the result that the rightful owner's brand was obliterated while the dishonest owner's brand stood very prominent. Those promiscuous brands had done more harm in the way of alienating ownership, and in some instances legitimising stock theft, than many other causes. He had no doubt that speculators of questionable repute would sooner or later avail themselves of flower-pot brands and thereby enrich themselves with the stray stock of honest farmers. He was told that in some of the States of America, the faking of brands was nothing unusual. The Australian Colonies had also suffered considerably under the same evil, and he was sorry to say that some of our law courts had also been patronised with cases of this description, and he believed in one case the owner failed to prove that his brand had been faked. Another objection against symbolic brands was that they could not be readily indexed, and to look for an unknown symbol in a brand's directory containing twenty thousand registered brands involved a little more time and labour than some might think.

A matter of first consideration in framing a branding law was the brand. It must be simple and consist of known characters, so as to avoid any possible difficulty in finding it in a brand's directory or in describing it in a telegram. To have such plain brands it was necessary

to adhere to the alphabet; but this consisted of only twenty-six letters, while they must have a supply of about forty to fifty thousand distinctive brands for each South African State, and they should endeavour to eschew the brands of one State clashing with that of another, nor should any registered brand admit of being altered so as to represent another registered brand.

Mr. Pienaar next referred to what had been done in Australia. Continuing, he said the three-piece system had proved itself in the Transvaal, and he would therefore recommend that it be adopted as a South African system, sub-divided into various branches. This system was so named on account of every brand consisting of three characters. By the adoption of this uniform system of brands, no brand of one owner could be altered by adding to it one or more characters, so as to make it represent the registered brand of another owner. There were various three-piece systems. As an example, he would select the one in use in the Transvaal Colony. In the Transvaal the brand consisted of two letters of the alphabet, except "I" and "O," which were exclusively used as numerals—and one numeral. With these twenty-four letters and the ten numerals, 0—9, they had more brands than they required for their Colony, and none of these brands were interchangeable. (The two letters and the numeral were of plain and uniform pattern, and placed in an even and regular line.) The first of the letters denoted the Magisterial district in which the brand was to be used. For instance, a Potchefstroom brand A1 would be PA 1, Pretoria AA1, Piet Retief FA1, etc. Here the P, A, and F denote the district in which the brand was to be used. The advantages to be derived from the dominant letter were of a threefold nature:—(1) It served to simplify the administration of the law. By the district letter a separate set of brands was secured for each district. The first of the two letters indicating the Magisterial district in which the brand was to be used, placed the Magistrate in a position to register any of the brands standing vacant in his district without fear that the Magistrate of any other district would register a similar brand. There were twenty-two districts in the Transvaal Colony, and the Magistrate of each district was doing his share towards the administration of the law; consequently they had a cheap administration. (2) It facilitated identification. For instance, if cattle were moved or strayed from one district into another, anyone in that other district would know at a glance to which district the animals belonged, and by referring to the brand directory he knew the name and address of their owners, and (3) it enabled the authorities to control the movements of stock and to prevent illicit movements of cattle from infected areas. This they admitted was an indispensable feature while they were subjected to so many stock diseases. Never in the history of South Africa was there a disease so terrible and so devastating as the East

Coast Fever, yet with the combined efforts of the veterinary staff and the farmers, it had been prevented from spreading over every inch of ground. All possible measures were adopted to control the movements of cattle. Fences were erected and a system of permits was introduced under the most stringent regulations, yet the disease, although much frustrated in its progress, gained a footing. At last it was recognised that even where the regulations were most rigidly applied, illegal movements continued to take place. Then a happy note was struck, and that was that some means be adopted whereby cattle could be identified. Recourse was taken to the Brands Ordinance. All the cattle in the Zoutpansberg district were branded, with the result that they were now able to trace all illegal movements. Immediately after branding operations were begun the demand for permits to move cattle became greater, and a large number of illegal animals were being traced. This was a clear indication that prior to branding many movements were being carried out without permits. The scheme was being carried out as follows:—In the case of natives, a brand was allotted to each farm on which there were native-owned cattle, and registered in the name of the natives. A branding supervisor was appointed to conduct the branding, and as soon as branding had been completed on a farm the branding iron was sent to the nearest fieldcornet or sub-native commissioner for safe custody. Under these circumstances, if cattle be moved from one farm to another the strange cattle could be identified at a glance. Again, if they were moved into another district, anyone seeing the cattle there would know by the district letter from which district they were removed, and should it be a quarantined district, he was compelled to report the matter to the authorities. The other letter in the brand might be selected by the applicant, and under this system they were in a position to give him whatever he wanted. For instance, "A" might register AA1, "B" AA2, "C" AA3, etc. Since the discovery of the three-piece system the thief had found another way of faking brands, and this was much more scientific than the manner of faking already illustrated, *i.e.*, to fake one of the letters in the brand. For instance, if the dishonest person registered the brand AG1 and another wealthy farmer's brand is AC1, he alters this AC1 into AG1. It was gratifying to be able to say that so far they had scored in their endeavours to prevent the faking of brands. The three-piece system had proved itself in other parts, and he would recommend that it be adopted as a South African system. It was simple, yet practical, and would, it was hoped, receive the support of every South African farmer, for such a system would sweep away many of the difficulties with which the South African farmer had to contend. He had wrought out a separate three-piece system for each colony. The characters comprising the brands in each system were so designed as to enable anyone to notice at a glance to which Colony the

brand belonged. In this way they were able to identify strange stock, and where a certain Colony was infected with contagious diseases, and in consequence thereof placed under quarantine, all the adjacent Colonies would be safeguarded by the brands.

By the adoption of such a scheme every farmer, in fact every inhabitant, of South Africa would become a competent inspector of brands, absolute control was exercised over movements of stock, and under these circumstances stock-theft would cease to be carried on in such an elaborate manner as at present, and the diseases would not spread so freely from farm to farm, from district to district, and finally from Colony to Colony.

HOW TO MAKE A WAX EXTRACTOR.—A correspondent writes as follows to *Farm, Field and Fireside*:—The best wax extractor is in the form of saucepan and steamer. My own, which I will describe as a guide, has the lower or saucepan part, in which the water is boiled to produce steam, six inches in depth. The upper part is twelve inches deep. Both are twelve inches in diameter. Fitted near the bottom of the upper portion is a plate or dish, which reaches the side all round within a quarter of an inch. It is fixed to the sides by three strips of tin, soldered to the dish and to the side of the steamer. Thus it will be seen the steam from the lower chamber can pass into the upper chamber. The wax or comb receptacle is a cylinder of perforated tin, eleven inches in diameter. This is placed upon the dish, which, when fixed, must be slightly raised on one side, and from the lower side out through the side of the steamer must pass a little spout, with three-eighths opening, and extending outwards in a slightly slanting direction, three or four inches. To keep the perforated tin wax chamber level a slight leg must be put on the bottom a little distance away from the spout. These may be placed on the dish or on the bottom of the wax basket. As the latter would not always be put in carefully, they had better be fixed to the former, then there could be no mistake, and the wax chamber would always be level, in spite of the slant given to the dish upon which it stands when filled with combs or pieces of wax. To work the extractor, nearly fill the lower vessel with water, and set the whole affair on the top of a stove. Place a bowl containing a little water at the side, with one edge just under the spout. When the upper chamber fills with steam the wax will be melted, and, passing through the perforations, will fall upon the dish and thence pass through the spout to the bowl placed to receive it. In order to ensure the wax being perfectly freed from all foreign matter and bits, make a flannel bag to fit inside the comb basket, and perfectly clear and clean wax will flow into the bowl.

The Wool Trade in 1908.

AN INTERESTING REVIEW.

THE wool trade of 1908 is reviewed in a most interesting manner in the Colonial Wool Circular, issued by Messrs. Charles Balme & Co. It is stated that business in the wool trade has been conducted under circumstances of exceptional difficulty during the past year, owing to the rapid contraction in consumption brought about by the banking crisis in America towards the close of 1907. The monetary stringency then prevalent all over the world checked business, and manufacturers, who had been fully employed up to the end of the year, found it increasingly difficult to obtain new orders. This state of affairs naturally led to a sharp fall in values of both merino and crossbred wools. The decline, moreover, was intensified by the large commitments in the overseas markets entered into by dealers, spinners and manufacturers, who, misled by the active condition of business in the various European manufacturing centres, had ignored the probable effect of the American crisis, and later on found themselves burdened with large quantities of dear wool, the liquidation of which involved very heavy loss. In these circumstances, the position in the trade had become so serious by May that exceptional measures had to be adopted to steady the market and prevent a collapse; consequently, prior to the opening of the third series, holders in London decided to take some 80,000 bales off the market, the quantity actually held over from these auctions reaching the huge total of 120,000 bales. From this point the trade entered on a period of recuperation, prices for all classes of wool remaining fairly steady for the next few months, which enabled the stock held in London to be gradually reduced. By November, business in America showed signs of revival, which became more pronounced after the Presidential election early in that month. This improvement caused a considerable demand for all classes of wool suitable for shipment to the States, which at once gave a tone to the market and led to a general rise in values, the trade realising that during the depression prevalent earlier in the year they had allowed their reserves of the raw material to run down to a lower level than was prudent now that the tide had apparently turned and that a recovery of business seemed imminent.

The course of events during the past twelve months has thus brought out prominently two points: (1) The closeness of business relations between the old world and the new, the fall in wool values being clearly the result of the American crisis of 1907, while the improvement which has recently taken place has also emanated from the same source; and (2) the narrowness of the margin at the present time between the world's wool production and the requirements of machinery, which is

proved by the fact that, notwithstanding all the adverse influences which have depressed the industry during the greater part of the past year, the whole of the season's production has eventually been absorbed, the quantity carried forward in London to 1909 being 4,000 bales less than the total brought into last year.

Although quotations for tops, more particularly those made from the coarser qualities of crossbred wool, were depressed by forced sales in the manufacturing districts towards the end of 1907, the easier phase of the money market noticeable at the turn of the year caused some improvement in the position of the various classes of staple, which was well maintained up to the opening of the January auctions. During their currency, competition was more active than at the preceding series, but prices generally ruled in buyers' favour. Among merinos the depreciation ranged from par to 5 per cent., the fall being most noticeable on inferior grades. The finest qualities of crossbreds sold readily at previous rates; demand for the coarser growths, however, was somewhat restricted, values for medium sorts declining $12\frac{1}{2}$ per cent., and coarse 10 per cent. South African greasies of good length and condition, as well as scoured, realised December parity, but short-stapled and inferior greasies were about 5 per cent. cheaper.

The result of the year's operations has thus been to establish a general fall in quotations, amounting to $7\frac{1}{2}$ per cent. on merinos, 10 per cent. on fine crossbreds, $7\frac{1}{2}$ per cent. on medium crossbreds, $17\frac{1}{2}$ per cent. on coarse crossbreds, $7\frac{1}{2}$ per cent. on Cape greasies, and $17\frac{1}{2}$ per cent. on Cape snow-whites.

The exports of semi-manufactured goods from December, 1907, to November, 1908, were £8,436,723 in value, as compared with £11,035,370 in 1906-7 and £10,057,102 in 1905-6. The exports of manufactured goods amounted in value to £19,159,320 from December, 1907, to November, 1908, as compared with £22,080,037 in 1906-7 and £20,595,655 in 1905-6. These figures vividly illustrate the extent to which the shrinkage in the export trade in consequence of the strained monetary position at the close of 1907 has intensified the depression which has prevailed in the wool trade during the period under review. Quantities as well as values have fallen off heavily, the decrease in the latter amounting to over 16 per cent. as compared with the satisfactory returns for the corresponding months of 1906-7. An analysis of the destination of the various exports reveals a substantial increase in the shipments of tissues to Argentina and Australasia, but a large diminution in those to Canada, Chili, and the Far East, while, of course, there has been marked reduction in the volume of business with the United States of America.

The value of the nett imports for the period December, 1907, to November, 1908, was £8,425,158, as compared with £9,763,728 in 1906-7 and £11,055,534 in 1905-6.

A table giving the supply and distribution of Colonial wool to Europe and North America shows the exports from Australasia to have risen from 1,118,000 bales in 1906 to 1,338,000 bales in 1907, and again to 1,413,000 bales in 1908. From Natal there has been a steady increase—30,800 bales in 1906, 46,000 bales in 1907, 55,500 bales in 1908. From South Africa (including the small Natal totals) the exports have been: 1906, 196,000 bales; 1907, 245,000 bales; 1908, 228,000 bales. The shipments direct from Colonial ports to the Continent were: 1906, 728,000 bales; 1907, 760,000 bales; 1908, 695,000 bales. To the United States: 1906, 28,000 bales; 1907, 47,000 bales; 1908, 10,000 bales. Total supply: 1906, 2,072,000 bales; 1907, 2,392,000 bales; 1908, 2,360,000 bales. The distribution of the wool was as follows: Home trade purchases, 1906, 751,000 bales; 1907, 858,000 bales; 1908, 908,000 bales. Continental purchases, 1906, 1,218,000 bales; 1907, 1,370,000 bales; 1908, 1,348,000 bales. United States purchases: 1906, 101,000 bales; 1907, 150,000 bales; 1908, 94,000 bales.

The total Colonial exports of wool, including shipments to India, China, and Japan for the past three years compare as follow: 1906, Australasian, 1,841,000 bales; South African, 240,000 bales; 1907, Australasian, 2,140,000 bales; South African, 287,000 bales; 1908, Australasian, 2,084,000 bales; South African, 275,000 bales.

From the River Plate shipments of wool were distributed thus: 1906-7, Continent, 394,000 bales; England, 52,000 bales; United States, 25,000 bales; 1907-8, Continent, 402,000 bales; England, 54,000 bales; United States, 23,000 bales.

Advices from the various countries of production do not indicate the probability of any great change in the volume of supplies available for the trade during the current year. In Australia, climate conditions have varied, as is only natural in so vast a continent; in Queensland and South Australia the weather has been favourable for sheep rearing, and a considerable increase in the shipments from the former State appears probable, while, on the other hand, the export from New South Wales is not likely to reach last year's figures, as drought has been experienced in many parts, notably the important Riverina district; some portions of Victoria have also suffered from a deficient rainfall. Taken as a whole, however, it does not seem likely that the Australian output this season will show any material decrease compared with the 1907-8 clip. Turning to South Africa, where the season has been favourable and the flocks are multiplying rapidly, reports suggest an increase in the shipments; reliable information, however, is not available as to the size of the increment, which in all probability will not exceed 20,000 or 30,000 bales. Severe snowstorms in the South Island of New Zealand during July caused a good deal of damage among the flocks in the mountainous districts; in other parts, however, as well as in the North Island,

the season has been propitious, so that some increase in the wool production of the Dominion must be reckoned with. The exports from South America have been more or less stationary for some years past, and although during 1908 conditions have been favourable, no expansion in the output is expected, the continually increasing demand for agricultural land, as well as the requirements of the meat works, having tended to prevent any material growth in the size of the flocks in that part of the world.

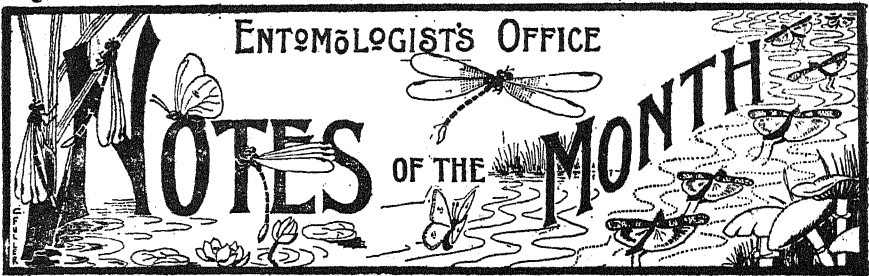
The outlook for the new year appears fairly encouraging. The American crisis has become practically a thing of the past, and under the benign influence of cheap money, trade in that country as well as in Europe and the East shows a tendency to revive, which augurs well for the future. In any case, the course of events in the wool trade during the past year has clearly shown that, even in times of depression, the world's production of the raw material is not in excess of the requirements of machinery, consequently, with a more or less stationary supply, any expansion in demand would soon lead to a higher range of values for both merino and cross-bred staple.

SHEEPSKINS.

Although quotations had been much reduced during the concluding months of 1907, fellmongers experienced considerable difficulty in dealing with their products during the first half of the past year, as, in addition to the rapid fall in wool values, roans were almost unsaleable, the American market being practically closed to them owing to the effects of the recent financial crisis. In addition to these unfavourable factors, the supplies dealt with at public auction have been unprecedentedly large, the embarrassment caused by the decline in wool prices not only hampering the operations of local fellmongers in Australia but also checking c.i.f. sales. During the latter part of the year, however, the more favourable position and prospects of wool, as well as an improvement in the demand for roans, enabled buyers to readily absorb the large quantities placed upon the market, the catalogues at the final sales being cleared at an all-round improvement in quotations.

The result of the fluctuations has been a general reduction in values. Among merino skins, quotations for full-woolled sorts now stand 10 per cent., half-woolled $7\frac{1}{2}$ per cent., and pelts $12\frac{1}{2}$ per cent. lower than at the end of 1907, while in the case of cross-breds, fine full-woolled descriptions are 10 per cent., and all other classes $12\frac{1}{2}$ per cent. cheaper. On lambskins the decline amounts to $17\frac{1}{2}$ per cent.

The quantities catalogued in London during 1908 amounted to 90,911 bales, as compared with 59,200 bales in 1907. The imports into London for the same periods were:—1908, Australasian, 62,879 bales; South African, 64,373 bales; 1907, Australasian, 54,904 bales; South African, 54,906 bales.



The English Sparrow.

By CLAUDE FULLER.

It is now four years ago since I drew attention to the presence and increasing abundance of English Sparrows in and about the City of Durban.

During those four years the Sparrows has not increased to an alarming extent, but there is every evidence of a steady progressive increase which will in time no doubt involve Natal, and, more seriously, the Orange River Colony, Basutoland and the Transvaal.

To-day holiday makers may see Sparrows on the Beach at Durban, and in every part of the town they proclaim their presence with discordant chatter, whereas four years ago one had to look out for them in the several centres where they had established nests.

The following is reprinted from my annual report for the year 1903-4:—

THE ENGLISH, OR HOUSE SPARROW.

Passer domesticus, Linn.

The presence of this pestiferous bird in Durban, and the certain indications of its increase since April, 1902, when Mr. J. D. S. Woodward called attention to it, are sufficient reasons for introducing some notice of the bird into this report. Apart from that, since I have become acquainted with its establishment at the Port, I have considered it my bounden duty to urge its extermination upon all and sundry; but the Sparrow is receiving the same apathetic attention here that it has received elsewhere whilst it is establishing itself in a new field and under fresh conditions and circumstances.

The circumstances of its introduction are similar to other cases, and can only be described as "the mistaken enthusiasm for things English." I gather that a few birds were imported by a gentleman in Durban some six years ago. These he kept in captivity for some

time, and then, because their chattering was such a nuisance, they were turned at large.

The situation at present is this: The English Sparrow, which must be classed amongst the worst of vermin, is now established in Durban, but so far does not extend to the rest of British South Africa. Nothing to control its increase and spread is being done, and the question is whether we in Natal are to sit idle and allow the pest not only to become a nuisance to ourselves but a menace to the rest of the Colonies.

I know there are arguments against the extermination and destruction of Sparrows. They are all the same and have been used over and over again, but they are the platitudes of senseless and ignorant or unobservant people. The case for and against the bird has been fought out again and again. It has been argued before Select Committees of the House of Commons and before those of colonial legislatures. It has been argued by many scientific men in many lands, and in every case the weight of evidence has been against the Sparrow, and the verdicts such as to warrant this Colony in taking every measure to suppress the birds altogether, at once and at any cost.

Some of the arguments which were originally advanced appeared sensible, and were based on the fact that for a few weeks the nestlings are fed upon insects. But hundreds of investigations by practical and by scientific men proved that these were vain; they found that the good done in this direction by the Sparrow was infinitesimal in comparison to the harm. Of the arguments which have been advanced in Natal, I need say nothing.

It is sufficient to say that the Sparrow is a bird which flourishes from the heated tropics to the frozen Arctic regions.

DESCRIPTIVE.

Most of us who have been beyond the broad lands of South Africa know sufficiently well the English, or house sparrow (*Passer domesticus*), but for the information of those who have not the following is submitted:—Adult male: length, 6 inches; wing, 3 inches; bill, bluish-black; legs, pale brown; the spaces between the eyes and the bill, black; a narrow streak of white over each eye; crown, nape, and lower back, ash-grey; region of the ear coverts, chestnut; back, chestnut brown streaked with black; wings, brown, with a bar of white on the middle coverts; tail, dull brown; throat and breast, black, sometimes suffused with bright chestnut; cheeks and side of the neck, white; belly, dull white. In winter the colours are duller, and the bill is yellowish brown. In the female the upper parts are striated with dusky brown; there is no black on the throat or grey on the crown, and the under parts are brownish white. The younger bird is deeper brown both above and below; the middle wing-coverts are tipped with buff; the bill is dull yellow.

The eggs are pale bluish-white, blotched, speckled or suffused with ash and dusky brown and black; measurements, 9-10ths by 6-10ths inch. The nest is of straw, hay, dry grass, and all sorts of odd materials; thickly lined with feathers; placed indifferently in trees, climbers, in the eaves of houses and other odd places.

According to Saunders*: "The House Sparrow is generally distributed throughout Great Britain and Ireland wherever human habitations are to be found. In proportion, as land is brought under cultivation, the sparrow makes its appearance and rapidly increases, so that it is now established in the Inner Hebrides, the Orkneys, the Shetlands, and other places where it was formerly unknown. In Scandinavia it occurs, in suitable localities, up to and beyond the Arctic circle . . . eastward it can be traced across Russia and along the inhabited portions of Siberia to Dauria; but not to Japan or China. Westward the House Sparrow occurs in Madeira. In Africa it is found from Morocco to the Albert Nyanza, while it swarms in South Arabia and at Aden. Introduced like the rabbit, through officious ignorance, into Australia, New Zealand and the United States, it has become such a curse that special legislation has been loudly invoked for its destruction."

AS A NUISANCE.

In England:—In England the annual loss from the House Sparrow is estimated at three-quarters of a million sterling. We find the Board of Agriculture branding it as "a serious pest of farmer and gardener alike," and recommending its extermination or suppression as far as possible. Before the Select Committee of the House of Commons, mentioned above, voluminous evidence was taken regarding the Sparrow. From the mouths of witnesses I select a few unclassified remarks:—

1. "The great objection I have to Sparrows is that they are exterminating the martins. . . . Sparrows are the best allies of flying insects. . . . No bird, in my opinion, does as much mischief as the Sparrow. . . . The Sparrow is not only the greatest corn-eater of any of the small birds, but he is not kept down by cold winters."
2. "Any law to protect Sparrows, if at all observed, would have precisely the same effect as offering a reward for the destruction of martins."
3. "The House Sparrow stands in a class alone, it can hardly be considered a wild bird; it is a parasite living on our produce."
4. "The Sparrow is mischievous in every way."
5. "I can hardly describe the harm the Sparrow does to me; he does harm in every possible way. *He is utterly bad.*"

* "Manual of British Birds." Howard Saunders, London, 1899.

6. "It is scarcely possible to say too much against these obnoxious birds."

In Australia:—The Sparrow nuisance is too notorious in Australia for any one to ignore. It has become established in every part, even tropical Queensland. The damage it does is enormous, but so firmly established has it become in the course of some 20 years, from the liberation of a few cage birds, that any steps to suppress it are now looked upon as hopeless.

In America:—In the United States the English Sparrow is described as a serious problem in economic science, particularly so far as the whole agricultural interests are concerned in their most comprehensive sense. Nowhere has greater attention been paid to it as a pest than here, and I have before me a report on the subject covering over 400 pages and dealing with every aspect of the question.* From this report we learn that the first Sparrows were introduced in America in 1850. For a long time the attempts to establish the bird were unsuccessful, but in the course of 25 years, during which Sparrows to the number of 1,631 were introduced to 15 places directly from Europe, they were spread purposely to 92 towns. This was about 1870-75, and from then up to 1888 the birds multiplied with marvellous rapidity. "Some idea of the alarming rapidity with which it is at the present moment multiplying and extending its range may be had from the fact that in the United States alone it has spread during the past 15 years (1873-88) at an average rate of 59,000 square miles per year."

The rate of increase of the Sparrow is remarkable. Merrian says: "Its fecundity is amazing. In the latitude of New York and southward it hatches as a rule five or six broods in a season, with from 4—6 in a brood. Assuming the average annual product of a pair to be 24 young, of which half are females and half males, and assuming further that, for the sake of computation, all live together with their offspring, it will be seen that in 10 years the progeny of a single pair would be 275,716,983,698.

Everywhere, in England, in America and Australia the Sparrow has proved itself an enemy of insectivorous birds. In Pennsylvania the native birds rapidly and steadily diminished in numbers with the advent of the Sparrow. The bird was introduced into certain towns in America with the hope that it would rid the elms and shade trees of the caterpillars which annually defoliated them. The utter futility of this hope is demonstrated in hundreds of cities and towns which are overrun with Sparrows and where the trees are repeatedly defoliated by worms. In New York it was found that the Sparrows actually protected the cater-

* "The English Sparrow in America." Merrian, 1899.

pillars of the tussock moth from their other enemies, and led to an extraordinary increase of the pest.

The following is the list of sms arrayed against Sparrows:—

1. They cause incalculable injury by driving away useful birds of insectivorous habits and by destroying their young.
2. They cause injury by the filth they produce.
3. They directly injure buds, blossoms, and foliage of trees.
4. They attack all fruits, viz., peach, pear, grape, plum, cherry, apple, apricot, orange and fig, attacking buds, blossoms and fruit.
5. They are directly injurious to vegetables, particularly peas and young lettuce and cabbage.
6. Grain crops such as wheat, oats, barley, rye, buckwheat, amabele, rice and imphce suffer from them seriously from the time of sowing until the grain is stored.



Carbon Bisulphide.

ITS NATURE AND USES.

QUITE recently the use of Carbon Bisulphide, as an insecticide, has become more general and popular in the Colony; more especially is this the case in treating stored mealies, and, in certain circumstances, in dealing with white ants.

Its application as an insecticide lies in:—

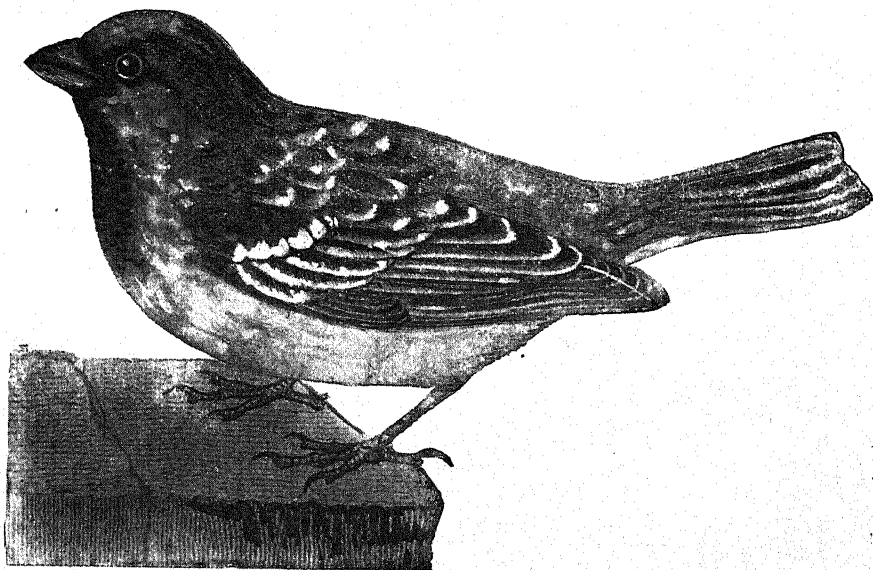
1. Its volatile diffusive nature.
2. The poisonous effect of the fumes on all animal life.
3. The weight of the fumes, causing them to penetrate downwards.

Pure Carbon Bisulphide resembles water in being a colour less liquid and possess a sweetish odour. As ordinarily supplied, it is more or less impure, possessing an unusually obnoxious and disagreeable smell and often slightly yellowish in colour. Directly the liquid is exposed to the air it volatilises, changing with great repidity from a liquid to a gaseous form. The gas or fumes are colourless, and, being much heavier than air, sink downwards through any air spaces. These characteristics and its diffusive nature, together with the fact that when properly applied it is not injurious to edibles and fabrics, give it many advantages.

The pure chemical can be poured directly over even the finest materials and fabrics without injuring or staining them; but as the "commercial" or impure form is that in general use, and naturally cheaper than the pure, it is best applied by placing it in wide, shallow



THE "UNIVERSAL ANT EXTERMINATOR" IN USE.



THE ENGLISH HOUSE SPARROW.

Passer domesticus, Linn.

vessels, which are put on top of the goods to be treated. In such positions it vapourizes quickly, and the heavy gas, sinking downwards, accomplishes its purpose. The disagreeable smell is quite harmless and passes readily away when the treated materials are exposed to the air.

Carbon Bisulphide, whilst easily manipulated, should be regarded as a dangerous poison to handle, and certain precautions against accidents must always be taken.

Not only is the liquid itself highly inflammable, catching fire most readily, but the fumes are equally so, and when mixed with air quite explosive. In using the chemical in any connection, therefore, it is imperative that no naked lights should be employed; and, for the time being, the ever-present smoker must be carefully watched and the mischief-working powers of his Boer tobacco and match-box guarded against.

Although poisonous, ordinarily a reasonable amount of fumes may be inhaled without dangerous results; more particularly when working in the open air. When operations are being conducted in rooms reasonable precautions must be taken, and, if the operator becomes affected with dizziness, fresh open air should at once be sought. Too long an exposure to the fumes would result in illness, and, of course, it is quite possible to be poisoned and suffocated by them.

The chemical should always be conspicuously marked "Poison" and stored in glass-stoppered or screw-plugged drums. Even under such circumstances it is apt to volatilise and so get lost, and if only a part of the quantity purchased has been used, a good deal of loss can be prevented by pouring water into the receptacle sufficient to form a layer of water an inch or so in thickness over the Carbon Bisulphide.

FOR GRAINS AND SEEDS.

The use of Carbon Bisulphide for treating insect-infested grains and seeds is very extensive; particularly because its use need have no effect upon their germination.

Some time since, fifty-four varieties of seed were treated as a test in the Department of Agriculture at Washington, U.S.A. "Every precaution was taken to ensure uniformity in the seeds of each lot, treated and untreated. The treated lots were exposed to an atmosphere saturated with Carbon Bisulphide fumes for 48 hours. Under the most severe treatment, the severity of which would never be equalled in ordinary practice, a majority of the varieties showed no injury, and germination was practically the same in each lot. Seeds of the grass family seemed more tender than other kinds. Experiments were also conducted upon grain in bulk, using the liquid at the rate of 1 lb. to 100 bushels of grain. The exposure lasted 24 hours, and at the end of this period no injury of any kind could be detected in even the most delicate seeds." (Johnson.)

The seeds to be treated should be in tight bins, barrels or boxes, which have tight-fitting lids or can otherwise be well covered. Seed in bulk stored in rooms can also be treated, but the rooms must first be made fairly gas-tight, the success of the fumigation depending, of course, upon how long the gas can be retained in the room. Stacks of grain can be fumigated if covered with a good tarpaulin. It requires very little ingenuity to make many receptacles and rooms sufficiently tight for the purpose of fumigation, and stout paper will be found to be quite efficient in covering cracks and openings through which the gas might escape.

In applying the chemical it is either poured over the seeds or on to cotton waste, which is then placed on top so that the escaping fumes may sink downwards. A very common practice is to put the necessary amount of liquid in a shallow dish or in saucers, and from which it is allowed to evaporate. From 1 to $1\frac{1}{2}$ lbs. of Carbon Bisulphide is sufficient for 100 bushels of grain or for 1,000 cubic feet of air space: that is, is sufficient for a room, bin or tank measuring 10 x 10 x 10 feet.

Whole buildings are sometimes treated with this chemical, and it would appear that much work in this direction is done in America, in the treatment of flour moth, weevil, etc. In treating mealies the Carbon Bisulphide can be safely applied directly on to the grain.

TERMITES AND ANTS.

White ants are one of the most serious pests to be met with all over Natal, and the amount of mischief wrought by them if it could be expressed in pounds, shillings and pence, would amount to a startling sum. They are most difficult pests to deal with once they have started their depredations in the house or amongst the garden plants, shrubbery, and fruit trees. This is due to the fact that in building, the ants are seldom properly cleared out of the ground, and, in laying off land for tree-planting, the same holds good. The mounds and visible queens may be destroyed, but the bulk of the colony, supplied with small supplementary queens, remain below the surface, unnoticed, until some catastrophe supplies evidence of their presence.

The practice of filling up the spaces beneath tiled verandahs, fire places, bathrooms and kitchens with soil and brick-bats, often intermixed with wood shavings, furnishes very congenial surroundings to white ants; indeed, in most cases of house attack, entrance is gained through these means, and as often as not nests are established therein. In such cases the boring of holes, at intervals of six feet, is suggested, down which 1 oz. Carbon Bisulphide may be poured regularly, say once a week, or as often as it found necessary, until the pests disappear. The holes should, of course, be plugged tightly with cork, and the verandah floor need not necessarily suffer much disfigurement. An alternative in taking up the tile and replacing it after treatment suggests itself, but I do not know

but what the first plan is just as desirable, and is certainly more convenient. Such places should always be treated when white ants appear in the walls, for the nest is almost certain to be situated beneath the tiled floors; in this case holes should be bored at intervals parallel with and distant about six inches from the wall. A little Carbon Bisulphide syringed into visible openings would also be advisable. It is almost unnecessary to add that a careful survey should be made of the environments of the house, and all nests discovered should be immediately treated, either with Carbon Bisulphide or, where possible, by the aid of

THE UNIVERSAL WHITE ANT EXTERMINATOR,

the general form of which machine is illustrated in the accompanying figure. This contrivance consists of an air-pump connected by a short length of rubber hose to a furnace. By working the pump, a continuous blast of air is driven into the furnace, entering beneath and escaping through a pipe near the top—shown to the left of the illustration—to which is attached a flexible iron hose. A charcoal or cow-dung fire is first started in the furnace, and, by pumping, got thoroughly alight. The powder is then sprinkled over the fire and the lid closed. By continuing the pumping, a very hot cloud of poisonous smoke is driven through the flexible hose. In use, the nose is inserted into a gallery of an ant's nest, and the smoke pumped in.

In the "Universal White Ant Exterminator" we have the most efficient and effective apparatus for destroying white ants in their nests which has yet come under notice.

Two rather unique cases in the use of the pump are worth recording. In the first case, a white ant's nest was discovered beneath the flooring of a farmhouse, and dug out. Later, white ants were noticed working at the mouth of a gallery 80 feet away from the house. Here the fumes were pumped in, and a few minutes later a cloud of smoke issued through the flooring of the room from beneath which the nest had previously been dug out.

In the second instance, honey bees had become a decided nuisance, making their nests between the lining and the roofing of a large verandah. Auger holes were bored through the ceiling boards and the smoke pumped in through a length of iron piping. The immediate result was to drive the bees out through every exit hole they knew of. Many dropped dead, but the great majority escaped alive. Afterwards, of course, the bees returned and, naturally enough, started to work cleaning away the poisonous deposit, with fatal results: an ironical return for their industry.

Wherever an ant gallery, sufficiently large (about half an inch in diameter) to admit the nose of the hose, can be obtained, the machine can be used with the most satisfactory results; not only are the insects

killed, but the galleries are thoroughly poisoned for an indefinite period. All other openings into the nest, which will be revealed by the issuing smoke, should be thoroughly closed, but not until the fumes have been allowed to pour out of them for a minute or two.

The powder spoken of is sold with the pumps. A cheaper and equally effective powder can be obtained by farmers at the Department of Agriculture, Maritzburg.

The small red and black ants will, of course, repay treatment with Carbon Bisulphide where their nests can be located.

STORED TOBACCO AND CIGAR WEEVILS.

We have in Natal several beetles which attack stored tobacco and cigars. Indeed, it is no uncommon thing to find many of the locally manufactured cheroots with weevils, or evidence of their having at one time been present. Moreover, upon the Coast, any cigars left stored away in a loose condition for any length of time will become badly infested.

Mr. W. Starr, of Verulam, grows much tobacco, and manufactures cigars and cheroots largely. Some years ago he made complaint regarding the weevil trouble, and, acting on suggestions then given, has been using Carbon Bisulphide with the utmost success in controlling and keeping the pest in subjection. The usual procedure is to place the infested material in a large box; an iron tank does very well.

The chemical is then poured into a saucer and placed on top of the material and the lid closed down for twenty-four hours. The quantity of chemical used should be the same as that advised for grain insects, *i.e.*, 1 lb. to 1,000 cubic feet, or 1 oz. to 63 cubic feet of air space.

WHITE GRUBS, MOLE CRICKETS, AND EARTHWORMS.

These pests, sometimes found in lawns and gardens, can also be treated with Carbon Bisulphide, the method to be followed being that outlined in discussing the destruction of white ants with this chemical.

CLOTHES, FURS, SKINS, CARPETS, ETC.

When found to be infested with clothes moths or other injurious insects, such items as those mentioned can be freed by fumigating with Carbon Bisulphide. They are placed in a box, trunk, or other receptacle, which should first be made tight with paper, and the chemical then placed in a shallow dish on top of the materials. Some sheets of paper are then spread over all, and the lid closed down.

MOLES, RABBITS, RATS, AND LAND CRABS.

Carbon Bisulphide has been very successfully used for destroying burrowing animals such as those mentioned, and other small animals

that live underground. Having located the holes or burrows, a piece of cotton waste the size of a hen's egg is saturated in the poison, and thrust far down into the hole, which should then be closed with loose earth, and packed firmly by stamping. Its use is to be recommended in preference to either strychnine or arsenic; both of these latter are dangerous to stock running loose, whilst the Bisulphide entails no such risk and is just as effective.



Naartjes or Mandarines?

In the last issue of the *Transvaal Agricultural Journal* Mr. R. A. Davis discusses the nomenclature of the Mandarine orange, and raises a question as to what term or terms should be generally adopted and maintained in so far as the export of these fruits from South Africa generally is concerned.

The question at issue is in reality whether the term "Naartje" should be employed as a generic name of Mandarine oranges in general, or whether it should be restricted to one variety or one group of this division of citrus fruits.

Personally, I would like to see the term retained for one variety, or, in other words, for the type of fruit which we in Natal recognise as a Naartje.

In this Colony there are two well-defined and characteristic fruits, coming true to seed and spoken of as "the" Naartje and "the" Mandarine. Other than these three are the Bombay or myrtle-leaved Naartje and the willow-leaved (either Dancy or Beauty of Glen Retreat).

The first two mentioned are old-established kinds which vary little in their characteristics, whilst the others are comparatively recent introductions. The Bombay Naartje is characterised by its loose puffy skin and deep red colour and conspicuous cells. It was, I believe, originally introduced from India by Mr. Medley Wood as the Suntara Orange, and would appear to be typical of this group of Indian Mandarines. Because of its foliage it is called the Myrtle-leaved Naartje by a few, and the tree itself has more the character of the Mandarine than the Naartje. The fruit is generally very typical, but I have been shown forms more approximating Naartjes and certainly somewhat of an improvement.

The "Willow-leaved Naartjes"—of which very few are in cultivation—are not generally preferred to the Naartje, but the variety certainly appears to have greater resistance against the peculiar physiological troubles to which the Naartje is so subject in this Colony.

The casual differentiation between a Naartje and a Mandarine is,

as Mr. Davis indicates, the flat base of the Naartje and the prominent nipple in which the stem of the Mandarin is inserted. But, just as one may find Mandarines without the protruding base, so Naartjes are not uncommon with quite pronounced nipples. The trees are, however, very distinct and the fruits have their especial characters.

The Naartje tree is pyramidal, very thorny, with vigorous stems and partaking somewhat of the common lemon in growth and foliage. The fruit is normally flat, with a firm, tight rind of golden-yellow or red-yellow colour, of little rag and juicy and piquant in flavour.

The Mandarin tree is domed-shaped, not thorny, stems lighter than the Naartje and foliages smaller and much darker. The fruit is more globose, loose rinded and never acquiring the rich colour of the Naartje, juice sweeter than the Naartje.

Last season we advised the fruits shipped separately as Naartjes, Mandarines and Bombay Naartjes. At first all the fruit was looked upon as only Mandarines, but there is ample evidence that the Naartje—as such—later came to be recognised as a particular and good type, and, further, as something peculiarly South African.

As time goes on I cannot help thinking that the qualities of the Naartje will be further borne in upon buyers and consumers and they will readily learn to distinguish the South African, or at any rate the Natal Naartje, as something apart from Mandarines and Tangerines.

For these reasons, therefore, I would like to see a standard set up for the Naartje as a distinct type from other South African Mandarin Oranges.

In his note Mr. Davis touches upon the deviation of the word Naartje, and ventures the opinion that the name came with the fruit from the east and has been assimilated into the "Taal." Mr. Davis adds: "If that is so, it is highly probable that quite without being aware of it, we have gone back to the original name of this fruit or something very like it."

There is certainly no doubt upon this score whatever, and to my mind Naartje is as directly derived from the historical original word for oranges as is the term "orange" itself.

The oldest terms for the orange is the Persian word *narang* and the Arabian *naranj*. Citrus fruits were brought to Europe and first grown in Spain by the Moors and there to-day retain practically their original name, for the Spanish for orange is *naranja*. The old English form *norange*, which euphony now renders as "an orange" instead of "a norange" is strikingly like the original, as is the French, *l'oranger*, the Dutch, *Oranjeboom*, the German, *pomerang*, and the Italian, *arancio*.

Had the early Dutch acquired the Naartje from Europe one would have expected the Taal diminutive to have been *orantje*; but, considering that the Persian word *narang* has travelled east as well as west and

is found in India in its original form as well as in the forms *narunj* and *naringhi* or *naranghi* (a term between five and six hundred years old in India which is to-day although applied to oranges in general still in particular is applied to a certain Mandarine), it is quite reasonable to suppose that *naartje* is a corruption direct from the Indian or Arabian terms. Indeed one only has to take the Arabian *narunj* and make a diminutive of it *narantje* to get a term as closely approximating *naartje* as possible.

Whilst general opinion points to the derivation of the Indian terms from the Persian, there is also a possibility that the Sanskrit word for the orange, *naranga*, is derived from *nagrang*—the colour of red lead, as claimed by the Pundits.

It is, however, thought that the fruit first became naturalised in S. India, arriving there from China by way of the Malay Archipelago, and was named *nartun* on account of its fragrant flowers, rind and leaves. From S. India it may have been taken by Arabs to Persia and the word *nartun* there corrupted, or the word *naranj*, which signifies "like a pomegranate," applied to it.

At present all we can say is that *naartje* is practically as directly derived from the Persian terms as is *orange*, *pomerang*, and *arancio*.



Pineapple Export.

In response to the offer made by the Minister of Agriculture at the meeting of fruit-growers held in Durban, some 1,400 odd pineapples were packed and shipped per the R.M.S. *Norman*, which left Durban on the 31st December, 1908.

It will be remembered that the Minister offered to forward a trial shipment to England free of freight and packing charges, with a view to ascertaining the best means and stage of ripeness in which to ship the summer crop and also to test the value of the pines upon the London market.

Despite the fact that I was able to give only a few days notice of my arrangements to ship by the *Norman*, eight growers came forward with pines. These were forwarded to the packing-house at the Point and there sized, graded and packed by myself and staff.

Altogether 1,422 pines were sent away, the consignment comprising 1,390 of the ordinary small Natal pines, running from 1½ to 2 pounds in weight, and 32 Cayenne pines weighing from 3 to 5 pounds each. Each grower's fruit was dealt with separately, the fruit being graded out in accordance with the degree of ripeness as manifested by the colouration.

PARTICULARS OF PINEAPPLE SHIPMENTS.

Experi- mental Lot No.	Total No. of Boxes.	No. of Boxes by C.C.	No. of Boxes by V.H.	Weight of Fruits lbs.	Remarks.
A 1	10	9	1	1½	These pines had been picked green and subsequently coloured up. Probably owing to a slight heating through the pines being stacked for some days, the stalks and basal leaves were shrivelled a little.
A 2	5	5	—	1½	Similar in condition to A 1.
A 3	1	1	—	2	Similar in condition to A 1.
A 4	2	1	1	1½	Fully coloured, fresher than A 1, 2 & 3.
B 5	5	3	2	1½	Colouring up, but not fully coloured.
A 6	3	2	1	1½	Similar to A 5. Ends of stalks sealed.
A 7	4	2	2	1½	Pale green.
A 8	2	1	1	1½	Pale green. Ends of stalks sealed.
A 9	6	3	3	1½	Greenish-black
A 10	3	—	3	1½	Greenish-black. Ends of stalks sealed.
A 11	1	1	—	1½	3 Colouring up; 9 coloured.
A 12	2	—	2	1½	Pale green; sent without stalks.
*B 1	3	3	—	1½	Fully coloured.
B 2	9	9	—	1½	Yellowish.
B 3	7	4	3	1½	Greenish-black.
B 4	3	3	—	1½	Fully coloured.
B 5	3	3	—	1½	Yellowish.
B 6	3	—	3	1½	Greenish-black.
B 7	1	1	—	2	Fully coloured.
B 8	1	1	—	2	Yellowish.
*C 1	5	3	2	1½	Fully coloured.
C 2	1	1	—	1½	Fully coloured.
C 3	1	1	—	1½	Fully coloured.
C 4	6	3	3	1½	Yellowish.
C 5	10	5	5	1½	Yellowish.
C 6	2	1	1	1½	Greenish-black.
D	4	2	2	1½	All greenish.
E	3	1	2	1½	All greenish.
F	4	1	3	1½	All greenish-black.
G	5	2	3	1½	All greenish-black.
H	2	2	—	—	All greenish-black.
I	1½	1½	—	—	Cayennes; greenish-black.
J	6½	6½	—	—	Cayennes; partly coloured.

NOTES.—*Mark B*: These pines were not so carefully forwarded as in the case of others sent in for export. *Mark C*: All pines freshly picked and delivered in good condition.

The attached tabulated statements detail the sizing and grading of each lot, and show the manner of stowage adopted in each case. Arrangements have been made with the Government Commercial Agent in London to examine and report upon the condition on arrival of each package, and I have every hope that the experiment will show, at the very least, what stage it is best to ship these pines in. It will also show how the different stages behave under the influence of cool stowage and by ventilated hold; and, further, some idea of the value of pines of the qualities and sizes sent will be attained.

The boxes selected for the small pines measured, over all, 24 by 12 by 6½ inches. These boxes are a very convenient size for the 1½ and 1¾ pound pines, holding a dozen of each with the stalks cut between 1½ and 2 inches in length. With one inch stalks the boxes carried 9 full 2 lb. pines comfortably, making a nice pack.

A great deal of insistence has been laid upon the desirability of shipping pines to the London market with long stalks, and it was my intention, at the start, to send these pines with 3 to 4 inches in length, despite the fact that pines of this size are usually marketed without stalks. When, however, I came to arrange the packs and found that by accepting 3 to 4 inch stalks I could only pack eight fruits to the box, I decided that it was better, in this instance, to sacrifice 8 inches of stalk which, in freight and packing were equivalent to four pineapples.

The boxes were paper lined and each fruit was also wrapped in stout paper, wood-wool being used as "packing." The dozen packs were in two layers with the crown of each successive pine reversed and with the upper layer covering the spaces between the fruit of the lower. The nine packs were similarly arranged, the lower layer being of five fruits and the upper of four.

In some instances the ends of the stalks were dipped in sealing wax with a view to ascertaining whether this process possessed any beneficial effect. Several boxes were sent containing fruit from which the stalks were entirely removed, and two boxes of eight fruits each were forwarded upon which the stalks were left long and the basal leaves not detached.

Packed by the dozen in these boxes I estimate the cost of boxwood and packing at 9d. per box. The freight by ventilated hold works out at 10d. per dozen, and by cool chamber at 2s. per dozen.

It will, therefore, be seen that if the fruit in any particular stage of ripeness arrives successfully, the cost of placing the same upon the market is either 1s. 7d. or 2s. per dozen.

Assuming that the pines realise 5s. per box, the market charges and commission will not amount to more than 6½d. At this figure then the total cost by hold stowage is 2s. 1½d., leaving a net balance of 2s. 10½d. per dozen, and by cool chamber 3s. 3½d., or a net return of 1s. 8½d. per dozen.

The present ruling price of pineapples upon the Durban market being 6d. per dozen, it will be seen that providing the pines can be successfully shipped, but a very low gross return upon the London market is needed to better the prospects of pine growers.

If the pines do not carry or if the fruits realise an unprofitable figure, the loss upon the experiment is not of any magnitude. Putting the value at 6d. per dozen, the value of the pines and the railage does not amount to more than £4, or an average loss of 10s. per shipper.

The freight and packing works out at £16, an amount which is being defrayed from the Parliamentary Vote for trial shipments of this nature.

The few Cayenne pines forwarded will be sufficient to demonstrate their carrying properties. These were packed in improvised boxes holding four pines each. I made no attempt to follow the Azores' method of packing, but at a later date I hope to send forward a shipment of this variety, preferably when Mr. Harrison's report upon those already shipped comes to hand.

CLAUDE FULLER.



The Controller of Excise calls attention to the provisions of Section 13 of the Excise Act, 1901, which is as follows:—"No person shall, without first obtaining from the Controller the appropriate license provided for in the second schedule of this Act, do any of the following things, save as by this Act specially excepted: Keep a still, make stills, distil spirits, rectify or compound spirits, sell methylated spirits by retail, make wine." All present licenses expire on the 31st December, 1908, and renewal licenses must be obtained from the Controller of Excise, Jameson's Buildings, Pine Street, Durban, not later than the 31st January, 1909. Stamps for these licenses are to be obtained at the Post Office only. All applicants for licenses must comply with the provisions of the Registration of Firms Act, 1906, before licenses can be issued.

According to the *Journal d'Agriculture Pratique*, it has been found that flies have a great objection to the colour blue—to such an extent that if the walls of a fly-infested shed are covered with whitewash in which some blue colouring matter has been dissolved, the flies will quite desert the place. It is stated in the *Journal* that a farmer had 170 cows housed in different sheds; they were pestered with flies, but he observed that in one shed, the walls of which were of a blue tint, the cows were not worried. He therefore added some blue colouring matter to the lime with which he washed the walls of his building, and from that time the flies have deserted his buildings. The following is the formula used by him for the wash:—To 20 gallons of water add 10 lbs. of slaked lime and 1 lb. of ultramarine. The walls are washed twice during the summer, when the insects multiply most and are particularly troublesome. The plan seems worth a trial, and we should be glad to hear of results from any farmers who may experiment in this direction.

The Position of East Coast Fever.

LIST OF OUTBREAKS DURING DECEMBER AND JANUARY.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the past two months:—

Dundee District.—Outbreaks on farms “Waschbank” (west of main line), “Sheepridge” (east of main line), “Whinstone” (east of main line), and “Mountain View” (east of main line).

Weenen County.—Outbreak on farm “Koorn Spruit.”

Umvoti County.—Outbreaks on farms “Mt. St. Bernard” (Mr. R. J. van Rooyen’s portion of “Rustenburg”), and “Summerfield.”

Klip River.—Outbreak on farm “Tylden,” sub-division of Pooteneas Spruit (west of main line).

Krantzkop Division.—Outbreak on farm “Sutherland.”

Umgeni Division.—Outbreaks on farms “Carlton,” Lots 2 and 10, “Kingston,” Lot 33, “New England,” “Malton,” “New Park,” and “Non Such.”

City Division.—Outbreak on farm “The Cloisters.”

Lion’s River.—Outbreaks on farms “Riversdale” (west of main line), “Gretna Green” (east of main line), and “Driefontein” (east of main line).

New Hanover.—Outbreaks on land of Summer Hill Wattle Co., D. von Fintel’s portion of “Green Hill,” H. P. von Fintel’s portion of “Green Hill,” and Lot No. 10.

Camperdown.—Outbreaks on farms “Skiddaw,” “Scawfell,” and “Klipspruit.”

Upper Umkomanzi.—Outbreak on farm “Trewirgie,” portion of “Driefontein.”

No record is kept of outbreaks in Zululand, Vryheid, Paulpietersburg, Babanango, Ngotshe, Lower Tugela, Mapumulo, Inanda, nor of those in the already infected locations.

The world’s production of phosphates in 1907 is placed at 4,347,107 metric tons, as against 4,092,243 tons in 1906. Of this amount the United States furnished 1,917,000 tons in 1907 as against 2,052,000 in 1906.

Crown Forests.

QUARTERLY CONSERVATION REPORT.

THE Chief Afforestation Officer reports as follows to the Director of the Division of Agriculture and Forestry:—

I regret that owing to pressure of work my quarterly report, due midsummer Michaelmas, has not been made, but the effect of the reduction of my Cedara staff of three to two has naturally been felt, and certain work hitherto performed must be, if not entirely cut out, necessarily late.

In happy contradistinction to last year, the elements have been most favourable, and, owing to the mildness of the winter (4 degs. of frost being the most registered at the Nursery) and early spring rains, the plantation increments and the condition of the nursery stock have been highly satisfactory. I hope to compile for publication shortly lists showing the comparative increments of the various species and varieties at Cedara and Empangeni, together with figures from private plantations where accurate data are obtainable. During May and June brands were fired completely round the plantations; the integral work so urgently needed has not been done, the labour vote being inadequate. The removal of the old fence and its re-erection in straight lines has made our perimeters more business-like and the danger of fire much reduced in consequence. The straightening of the fence increased the forestal area considerably, and much of the land so acquired has been broken. No portion of the new areas has yet been planted, but preparation has been steadily pushed on, and December monthly report, which will be put up for your information as per Section 7b, of Circular 1st October, 1908, will contain details as to mealie planting therein. The material saved by the alteration of the fence has been returned to the farm store.

Plantation thinning went on continually during April, May, June and July, and a large stock of poles is now on hand. Considerable numbers of these are being used for pole drains in the Reit Spruit Vlei. A year hence I anticipate that the quantity of thinnings available will be altogether in excess of the Farm requirements, and firewood will be available for Government Departments which now have to purchase wood for native and school rations. The home arboretium, nearly 70 acres in extent, has had all double leads removed, and thinning of alternate lines in the *E. obliqua*, *E. gunni* and *E. sideroxylon* section has been done. The thinning of *E. corynocalyx* plantation too has been completed, and the trees now stand 5 x 10 and are canopying very rapidly.

Trespassing by natives having become very frequent, I instituted a prosecution, which led to a conviction, the native, Maceba, being fined 10s., or a week. A marked diminution of the offence is the result. The purchase of Cedara by Government closed many paths the natives were in the habit of using, and the opening of an Arab store near the main gates has naturally increased kafir traffic. Forest areas are, however, being much more respected. Owing to the unreliability of local men as forest guards, a boy has been obtained from the Eshowe Division of Zululand, and thefts of wattles and trespass of goats and sheep have become more or less things of the past.

The brow of the hill immediately below the Orchardist's house, in which the fruit trees were irreparably injured, has been taken over for afforestation, and trees at 5 x 5 spacing have been planted:—

Cupressus lusitanica, 4,700 *Acacia melanoxylon*, 2,670.

Eucalyptus occidentalis, 890.

The seed of *A. melanoxylon* sown in the strip south of the Experimental Plots having germinated badly, the plantation has been completed by transplants, some 2,000 being used in this connection.

Thinning of the avenue pines has been commenced and will be completed shortly.

Lists of trees sent out to Government Departments, sold to the public, etc., will be compiled at the end of the year.

CONSERVATION REPORT FOR DECEMBER.

THE Chief Forest Officer (Mr. G. H. Davies) reports as follows to the Director, Division of Agriculture and Forestry:—

I beg to report for the month of December, 1908: The *Cape Argus* of 20th November devoted its leading article to the subject of the desiccation of South Africa, doing me the honour of reference to my report published in the October issue of the *Natal Agricultural Journal*. It is gratifying to note that observers in the Cape Colony, Orangia, and the Transvaal concur emphatically with me both as to the fact and to its cause (denudation of forests) and that, in reparation, we must plant afresh. The Home Press is also taking up the subject of afforestation, but from an economic standpoint: the assistance of the unemployed, and the production of revenue from Crown lands. A country that can afford old age pensions should certainly utilise all its soil, but here we have a different aspect of the problem. Climatic reasons are, with us, important enough to take precedence of the immediate production of revenue, and as the veriest scrub-forest of natural formation is climatically more valuable than a plantation of fine timber many times its size, conservation of the remnants of our wild forest should be the first care

and afforestation second. Unfortunately, financial considerations are apt, in a young country, to make it difficult to spend upon necessarily unproductive (directly) conservation, or even to sink adequate capital in such afforestation as would eventually repay the cost of conservation. In Natal, too, we have to meet a demand for land for closer settlement, which seems to oblige us to alienate a large number of small wild forests that should be the nuclei of plantations, and which we part with in the hope that the poverty of their timber and the inaccessibility of their sites will preserve them from destruction. I believe that in many cases the bushes recently abandoned are safe from absolute destruction for these reasons; but some are not, and I do not see why protection cannot be afforded to all natural forest, on private as well as on public land. That a really effective forest law was not passed in the early days of the Colony is a huge misfortune. What wealth would have been saved! What irreparable losses prevented! As it is never too late to mend it is not too late to take action now: but, obviously, the sooner the better. In this connection, Forester Ball, of Olivier's Hoek, reports that the settlers on the new allotments in the Berg have already begun to sell wood from the bushes there. It will be hard to make a living off such lands.

At the Ingwangwane, on the Griqualand border, Forester Fernando reports that the Government Land Valuator, Mr. Forsyth, has been inspecting the Crown lands adjoining the Xalingena and Ili forests, of which the beacons were pointed out to him, and also the cash value of the standing crop of timber. Another visitor, a timber merchant, is considering the erection of saw-mills at these forests.

Forester Fernando notes the profuse flowering of the *umbaba* (*Calodendron capense*) this year, and accords it a cycle of five years for special display. Forester Ball is equally struck by the blooming of *Dais cotinifolia* (as the tree he describes must be) and possibly the fine show in the Emkazen Forest—grandly staged on a mountain side—is helped by this flower, so like, at a distance, that of the wild chestnut. *Dais* is not a large tree and would be an ornamental addition to our gardens. It prefers the edges of bush, and is often seen isolated outside them. It should therefore be easily transplanted or reared. Forester Fernando also notes the luxuriance of the hemlock just now, and thinks that visitors to the forests should be warned against it—especially children. With regard to *Rhamnus prinoides*, mentioned in my report in the November issue, Forester Chilvers points out that he named "Dog Plum," not "Dogwood," as being deciduous at Ingeli. *Ekebergia capensis* should therefore be substituted. These vernacular names are often confusing, and Dog Plum is also known as "Essenwood," which is also attributed to *Ekebergia Meyeri* and to *Trichilia emetica*. The bark of *E. Meyeri* is, according to Forester Fernando, used by natives as

an emetic, and it is probably the same tree as *Trichilia*—the only distinction between *Ekebergia* and *Trichilia* being that the latter has a dry, splitting capsule while the fruit of the former is fleshy, unopening. Forester Houshold remarks upon the plentiful growth of seedlings of sneezewood and Cape beech in the Gongoma portion of the Qudeni Forest this year; the latter, however, does not succeed very well in the interior of bush.

Forester Foster, who sowed some yellowwood seed in various parts of the Ngomi Forest, reports that they are coming up. He states that his nursery sowings have not been successful, but that is a matter for the Chief Afforestation Officer. So is, I believe, the thinning of the wattle plantations, but the papers are still in my hands awaiting the completion of the work. It is unfortunate that, as natives are doing little or no hut building or repairing, the thinnings are being mostly cut to waste. Forester Fernando succeeded in selling a little of it, but his thinning will, on the other hand, cost considerably more in cash than Forester Purser's. The admission of sunlight may cure the "blackspot" prevalent in the Ingeli plantations.

The Ingeli forests seem swarming with animal life, and by the report of Forester Chilvers the hunting of last winter has not appreciably thinned the bushbuck. Forester Purser mentions in his report the complete reversal of parts by three bushbuck chasing his native boy into his own hut. The eland at Giant's Castle have now formed up into large herds, one of which was estimated (by native guards) to contain two hundred head, inclusive of a great many calves. Forester Symons thinks that several old bulls should be shot to prevent their continual battles with the young bulls. There is, however, another aspect of the matter: the challenge of the old males is Nature's method of securing vigorous sires. In the case of animals we intend to tame, however, there is something to be said for interference with this pugnacity, which is favourable to wildness of disposition and tends to lower the rate of increase. We can do the selection of sires ourselves, and so improve the breed for domestic purposes.

Forester Mason blames the mongrel dogs of the natives as the chief destroyers of game in his forests. The present dog tax seems to allow too many of these half-starved creatures to exist. The native does not pay money for nothing, and so must get its worth out of the dogs somehow—possibly in canine affection.

At Ngomi Forester Foster came twice across leopard-killed bluebuck. Cane-rats, of which he saw three, are complained of by the natives for their depredations in the mealie and mabele gardens. The latter are now attracting the baboons, who are moving up to positions from which they can raid the mealies already in cob. The natives' crops are reported as promising at Ngomi and the result should be

favourable to the rent-roll of that forest, where the squatters have been paying up their arrears fairly well of late. As mealies were recently £2 a bag, the green mealies now ready must save the natives much expenditure. In Alexandra County Forester Rigg reports that natives are ploughing up more land than last year.

While Forester Clark, of Empangeni, reports December weather as dry and hot, most other stations return it as very wet. Beyond Vryheid—at Pongola Bush and Ngomi—and on the west at Ingwangwane and Bulwer and elsewhere rivers have been up and rains heavy. I can speak of Bulwer myself as my trip there was spoilt by rain. At Ingeli rain fell on 22 days, but along the Berg it was drier, Forester Mason reporting drought, and Forester Symons and Moller, at Giant's Castle and Normandien respectively, stating that with them the first half of December was wet and the latter half dry. Hail was pretty general, a great storm doing much damage at Bulwer on the 23rd instant. Fortunately for me I had then left that charming resort.

The preparation of potash as a by-product of sunflower culture is one of the industries of Northern Caucasus. The potash is prepared by lixiviation of ashes of the stalks, stems, leaves, etc., of the sunflower, evaporation of the solution, and calcination of the residue. Twenty-four factories in Caucasia in 1907 produced about 12,600 to 16,200 tons of potash. About one-fourth of the product is used in Russia, and the rest is shipped to foreign countries.

MOULDING WAX.—Wax in a large cake is readily saleable if of good quality, but if it is sold in one, two, and four ounce cakes it is more likely to create a demand for such convenient pieces of a domestic necessity. Moulds to give blocks of various sizes are made and used by many bee-keepers. By a little testing it could soon be found out what size would sell best, and what form the mould should take to give the requisite sizes. To make such a block with movable cross pieces is not beyond a bee-keeper who can use saw and plane, or one who is clever with the knife and has the necessary patience.—“Ivo” in *Farm, Field, and Fireside*.

Among the Farmers.

THE ASSOCIATION DURING THE MONTH.

THE present is a busy time of the year in the fields for farmers, so that we have, for the last month or two, had little to report on the doings of the associations. This month we have a few reports before us, the first of which relates to the annual general meeting of the Rosetta Co-operative Association, Ltd.

ROSETTA.

The annual general meeting of the Rosetta Co-operative Association, Ltd., was held at the Rosetta Hotel on Tuesday, December 15th, 1908:—

The Chairman (Mr. C. Groom), in moving the adoption of balance sheet and directors' report, stated that the turnover of the Association for the year ending 31st October had been £12,835 7s., an increase of over 150 per cent. on the preceding year. Crops had been above the average and prices during the last three months of the year abnormally high.

Trade had been distributed more widely than hitherto, and it was intended to further test the London market by small weekly consignments of new potatoes.

In spite of the large increase in trade with Johannesburg and other inland markets at very remunerative prices, Durban had been the principal outlet for produce, and the system of delivery direct to the consumer had proved so successful that it was intended to increase the number of cash carts and scope of the Association by selling all lines of produce and fruit, in addition to potatoes.

The year had been a most successful one, and the directors had pleasure in recommending a dividend of 8 per cent. Lieut.-Col. B. Crompton supported the motion, which was carried unanimously.

It was resolved to increase the number of directors to five, to provide seats on the board for the nominees of members of the Association or affiliated societies in other districts.

The retiring directors were Messrs. C. Groom (chairman), C. R. Heenan, and W. F. Taylor, the latter not seeking re-election.

Messrs. C. Groom and C. R. Heenan were re-elected. Lieut.-Col. B. Crompton, Mr. J. W. Johnston, and Col. W. Sangmeister (Lower Umzimkulu Farmers' Society) were elected.

The retiring auditor, Mr. V. W. Steward, was unanimously re-elected.

EMPANGENI.

A general meeting of the Empangeni and District Sugar Planters' Club took place on Wednesday, 13th inst., at Empangeni. Amongst those present were Messrs. Percy Stott, C. B. Addison, Herman Goodman, T. C. Sturrock, Salveson, Blake, and C. S. Paul. Mr. Stott presided.

The question of the reconstruction of the Club was discussed at length, and it was finally agreed to change the name to that of "The Empangeni and District Sugar Planters and Farmers' Association."

The following new officers were then elected:—President, Mr. C. B. Addison; vice-president, Mr. P. Stott; secretary and treasurer, Mr. Felix Piccione; auditor, Mr. Carey; committee (with power to add four others), Messrs. P. Addison, Salveson, Blake, and G. Higgs. The draft rules of the Association, as drafted by the committee, were then submitted, and adopted with amendments and additions.

TRAM LINES.

The Chairman stated that at their last meeting a resolution was adopted instructing the secretary to write the Minister for Agriculture, complaining of the delay on the part of the mill proprietors to fulfil that portion of their contract in regard to the laying of tram lines to convey planters' cane to the railway siding. A reply had been received, advising the Club to seek legal remedy. Since then, however, Mr. C. B. Addison had constructed a heavy narrow gauge line from a point near the Umhlutuzi Bridge, through several farms, to his cane. This line, though private property, was laid in such a way that it was convenient to all the cane farms on the Umhlutuzi Flats.

Mr. Addison mentioned that the mill proprietors had stated that they were not opposed to providing the necessary facilities for the conveyance of planters' cane to the mill, provided the planters' cane offer sufficient security for the outlay and payment of interest at 6 per cent., but at the same time the mill proprietors thought the necessary means of transport could be far more economically carried out by the planters themselves.

Several members thought that no effort should be lost to insist upon the mill proprietors carrying out their legal obligations under the agreement.

It was ultimately resolved to form a committee to go into the whole matter, and to report fully to a special general meeting.

NATIVE WAGES.

Mr. Piccione mentioned that there was a desire on the part of some of the members to go into the question of seeing what could be done towards controlling the rate of wages of native labourers employed by local planters.

Mr. Carey urged that the planters should consider the question seriously, as the Kafir was being by far too highly paid for his services. The planters could fix the rates of pay for certain classes of work.

Mr. Addison thought the native here was not too highly paid, as in other parts they were paid 1s. per diem, and the ordinary wage was 20s. per month, which was certainly a low rate of wage.

Mr. Goodman said that if such an agreement were made, it would not act beneficially on the planters; besides, if the rate of wages were lowered, he thought the boys would simply stay idle in their kraals and refuse to work.

Mr. Stott was of opinion that wages were inclined to be a little too high for boys, but did not think any binding rate should be agreed to just at present. The matter then dropped.

EAST COAST FEVER.

The Chairman stated that the committee had written the Magistrate of Mtunzini, complaining of cattle from near the Ngoye Mission Station, which was an infected area, being allowed to move to the Umhlutuzi Station. The Magistrate's reply, dated 28th ult., was read, in which it was pointed out that no disease existed yet near the Ngoye Mission Station, but that the Club's letter would be placed before the next meeting of the East Coast Fever Association Board. The committee's action was confirmed. It was decided to approach the Government with a view to the appointment of an East Coast Fever Board for the Umhlutuzi Flats.

FARM RENTS.

Mr. Piccione pointed out that with any first-class farm in the flats, the Land Board issued building sites on the ridge of a sandy hill, the rent for such sites being the same or similar to that charged for first-class farms. Further, many planters had, since commencing operations on their first-class farms, discovered in many cases that a larger portion of the land was either too poor for crops, or too moist and swampy, and he thought in such cases the Government should reduce the rents.

Mr. Stott stated that he thought the Government, when application was made for conversion into freehold of any lot, would value the ground for such purposes, and naturally take any such defects mentioned by the previous speaker into account.

It was then agreed to communicate with the Government, with a view to reductions being made in the rentals of building sites, and portions of first-class farms which were too poor for cultivation.

The President, Mr. F. Addison, mentioned that as this body had now extended its scope by embracing agriculture generally, any person was now eligible for membership, and he hoped the farmers who had not already joined would do so soon, and strengthen the hands of the Association.

SWEET POTATO GROWERS ASSOCIATION.

We referred some months ago to an important new industry which was being started on the Coast—namely, the manufacture of starch from sweet potatoes. Sweet potatoes grow well in many parts of the Colony, and there seems to be every prospect of a large industry being built up, provided farmers rise to the occasion by supplying the raw material to the factory. We note with interest that an association has been started, under the title of the “Natal Sweet Potato Growers’ Association,” and with its headquarters at Wartburg. A meeting of the Association was held at the Green Branch Hotel, at Wartburg, on the 22nd December, at which there was a large attendance. Mr. Mitcheson, the manager of the Natal Starch Factory, at Umgeni, was present, and he gave the meeting some idea of the prospects of the industry which he represented, pointing out the large market which now existed for sweet potatoes, and urging farmers to go in for their cultivation more extensively. We trust that farmers living in those parts of the Colony where sweet potatoes will grow and yield a profitable return, will seriously take Mr. Mitcheson’s advice to heart. Sweet potatoes will grow on any sandy soil, and the yield is very considerable per acre, so that no very large area need be planted—at first, at any rate,—by each individual farmer.

We have received a copy of the Rules and Regulations which have been drawn up for the use of the Natal Sweet Potato Growers’ Association, and we have pleasure in printing same herewith. They are as follows:—

Par. 1.—The name of the Association shall be the “Natal Sweet Potato Growers’ Association,” and it shall have its headquarters at Wartburg.

Par. 2.—The object of the Association shall be to forward the interests of sweet potato growers in Natal.

Par. 3.—Membership of the Association shall be open to all *bona fide* sweet potato growers, farmers and manufacturers. The committee shall consider and deal with applications for membership.

Par. 3.—Members shall pay an annual subscription of five shillings, and such annual subscription shall become due and payable in advance on the first day of January in each year.

Par. 5.—Any member who shall be three months in arrear with his subscription, after due notice given, shall not be entitled to any privilege of membership until his subscription has been paid. Any member who is six months in arrear with his subscription may be struck off the roll of membership by a vote of the members of the Association then present. No person shall be entitled to vote at any meeting until he has paid his subscription.

Par. 6.—A member may be struck off the roll of membership by

a vote of the Association for an infraction of the Rules for the time being in force, or working against the interest of the Association directly or indirectly, or of the Bye-Laws from time to time framed by the committee.

Par. 7.—The officers of the Association shall consist of a president, two vice-presidents and a committee of fifteen members, who shall be elected at a meeting of members to be held in the month of January of each year. The committee shall have power to fill any vacancy in their number caused by death, resignation, or absence of any member from three consecutive meetings without leave of absence granted. Any appointment so made shall be subject to the confirmation of the next ensuing general meeting.

Par. 8.—The committee shall have power to transact all business on behalf of the Association, and especially:—

- (a) To collect and disseminate information of value to the Association.
- (b) To represent the needs and wishes of potato growers to Government, the shipping companies, agents, dealers, etc.
- (c) To make, rescind, and vary Bye-Laws for the government of the Association, and for the better carrying into effect of its objects, and also Rules for its own government.
- (d) To impose penalties for the breach of Rules or Bye-Laws, subject, however, to a right of appeal to a general meeting of the Association.
- (e) To appoint "office-bearers."

Par. 9.—The committee shall have a meeting whenever deemed necessary, and at such meeting five members shall form a quorum.

Par. 10.—A special meeting of the committee shall be called by the secretary, and held whenever directed by the president or vice-presidents, or when a meeting shall be requested by two members of the committee in writing.

Par. 11.—The annual general meeting of the Association shall take place yearly in the month of January, or as soon thereafter as possible. The business of such meeting shall be to receive and consider the report of the committee, a statement of receipts and expenditure, to appoint a president, vice-president, and committee, and such other business as shall be set out in the notice calling the meeting.

Par. 12.—A special general meeting shall be held whenever so directed by the committee, or when a requisition signed by not less than five members shall be received requiring such a meeting to be held.

Par. 13.—All questions arising at any general meeting of members shall be determined by a majority of the votes given by the persons present and entitled to vote.

Par. 14.—Ten days' notice of all general meetings shall be given

by post to each member of the Association, and no "important business" shall be transacted at any such meeting, but such as is indicated in the notice calling the meeting.

Par. 15.—These Rules shall not be added to, altered or amended, save when one-third of the members of the Association are present at any general meeting called for the purpose.

The President and Secretary of the Association are Messrs. H. Wortmann, Singleton, and A. Meyer, Wartburg, respectively.

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

WE have received a copy of the *Transvaal Brands Directory, 1907*, which has been compiled by Mr. J. J. Pienaar, the Registrar of Brands, and issued as the fourth edition of Farmers' Bulletin No. 17 of the Transvaal Department of Agriculture. It contains a complete list of brands allotted and registered at the different Magistracies up to the 31st December, 1907. The Registrar of Brands, in his Introduction, states that a fairly large number of brands were allotted to natives outside native Locations in the Districts of Zoutpansberg, Waterberg and Barberton. These brands, along with the names and addresses of their respective owners, have been inserted at the end of the list of European brands appearing under the sections of those districts. An article is also included in the Bulletin on how to apply for and get brands registered, and how to brand.

"Phalaris Commutata" in Cape Colony.

Phalaris commutata, the new perennial fodder grass to which we referred in our November issue, is being tried in Cape Colony, according to a note which appears in the January number of the *Cape Agricultural Journal*, Mr. James Gray, of "Waverley," Ceres Road, having imported some seed from Australia and experimented with the grass. Mr. Gray's experience is interesting and confirms the statements of experimenters in this Colony. He sowed the seeds about the end of January last in a row about three feet long. It came up in about ten days' time; it was kept well watered, and by the end of April stood about 18 inches high. It was then transplanted, the yield being 220 plants, which were planted in rows three feet apart, the plants being placed two

feet apart in the rows. An ordinary dressing of kraal manure was applied and afterwards a little superphosphate. In August Mr. Gray took up one of these plants and planted it on one of the driest spots of the farm, watering it for the first week. A very dry spring ensued, the earth was hard and the bush brown all around it at the time of writing (December 9th), yet this plant was still green and in full ear, standing about four feet high. Mr. Gray thinks that had it not been for the re-transplanting it would have done as well as the irrigated plots. Mr. Gray adds that the *Phalaris* stools planted last April are much bigger than his *paspalum* planted three years ago.

Nitrogen Content of Soils.

In the Wisconsin Experiment Station Report for 1907 is given a continuation of observations begun in 1906, on the changes in the nitrogen content of a number of clay loam soils under the influence of continual cropping in a general system of farm management. Determinations of nitrogen in the cropped soil and in similar virgin soil are given.

The results show in general that the largest loss of nitrogen has occurred in those soils which ordinarily contain a rather large percentage of nitrogen. In 16 out of 21 cases in which the virgin soil contained 0.2 per cent. of nitrogen, or over the loss of nitrogen above that removed by crops, probably due chiefly to denitrification and leaching, exceeded 500 lbs. per acre. In 21 out of 26 cases in which the virgin soil contained less than 0.2 per cent. of nitrogen the loss of nitrogen was less than 500 lbs. per acre. The average losses were 29.6 per cent. of that removed by crops in 1907 and 22.3 per cent. in 1906. The loss of nitrogen about that removed by crops was greater when the soil was manured than when no manure was applied. "This seems to indicate that the nitrogen added in the form of manure, as ordinarily applied, does not accumulate in the soil, and suggests the desirability of a very careful study of the methods of applying farmyard manure to determine whether it should be applied in very small quantities annually, or larger amounts at intervals of 4 to 6 years, as is the customary practice."—(*Expt. Sta. Rec.*)

The Keeping of Apples.

In Bulletin No. 135 of the New Hampshire Experiment Station, reviewed in No. XLVIII. of the *Experiment Station Record*, Professor F. W. Morse brings out in a very striking manner the fact that the steady loss of weight which fruits such as apples undergo even under most favourable conditions in storage is due to a process of breathing similar to that occurring in animals, whereby oxygen is taken in and

carbon dioxide given out. This breathing or respiration is stated to be "partly a chemical reaction, and in apples, like most chemical reactions in the laboratory, it grows more rapid as the fruit becomes warmer and is slowed down when the fruit is cooled." Prof. Morse's experiments indicate that these chemical changes "takes place from four to six times as fast at summer temperatures as in cold storage, and from two to three times as fast in cool cellars as in cold storage."

"It is frequently the case," Prof. Morse remarks, "that warm days with temperatures of 70 deg. F. occur in October, and sometimes continue for a considerable period. Fancy apples intended for long keeping in cold storage should be cooled as soon as possible and kept cold. The breathing process is at the expense of cell contents and must weaken the keeping qualities as it goes on. And this destructive action is from four to six times as fast out of cold storage as inside it. Another fact in connection with the respiration is important. It is not stopped in cold storage, but simply slowed. Apples cannot be kept indefinitely, but keep about twice as long in cold storage as in a cool cellar."

A Cattle Spraying Machine.

In the September issue of the *Cape Agricultural Journal* there appeared a short description, by Mr. C. P. Lounsbury, the Government Entomologist, of the Seabury Cattle Spraying Machine; and in the December number Messrs. Wm. Cooper, B.A., F.C.S., F.Z.S., and Messrs. H. E. Laws, B.Sc., F.I.C., describe the working of these machines, one of which have been installed at Messrs. Wm. Cooper & Nephews' farm, "Gombie Park," near East London.

The machine consists of a tunnel (9 ft. in length and 6 ft. 4½ ins. in height), which acts as a passage for the cattle. This tunnel is 14 inches wide along the floor, increasing in width gradually to the height of 2 ft. 1 inch, where it is 1 ft. 11 in. wide. From this point the tunnel bulges out considerably on both sides, measuring 3 ft. 3 in. across its widest part. When once the beast is in the tunnel, it is almost impossible for it to turn, owing to the bottom portion, up to the height of just over 2 feet, being so narrow. Along the inside of the sides of the tunnel are several series consisting in all of twenty terminals of one-foot pipes, attached to which are hemispherical screwcaps, which act as nozzles and through which the spray fluid is pumped. There are also two of these terminals and nozzles in the floor of the machine. The spraying fluid is delivered through the nozzles by means of a centrifugal pump, working at 1,200 revolutions per minute, fitted with a 3¼ inch suction pipe about 3 ft. 6 in. to 4 ft. long and 2¾ in. discharge pipe. The engine driving the pump is a 15-h.p. gasoline, made by Messrs.

Fairbanks, Morse & Co. An electric prod is used for urging reluctant cattle into the tunnel.

Experiments are now being carried out to ascertain the efficiency of the machine compared with that of the ordinary cattle dipping tank. For this purpose, a variety of dipping fluids are being used to discover the difference in action, if any, on the cattle when this new method of spraying is adopted, as against when the cattle are dipped; but from their experiments in its use, Messrs. Cooper & Laws state, up to the present the machine is disappointing. They are, however, endeavouring to make such alterations in connection with the positions and numbers of the nozzles, etc., so that the machine can be so modified as to be of practical use to South African cattle farmers residing in tick-infested areas.

Dry Rot of Maize.

According to T. J. Burrell and J. T. Barrett, of the Illinois Experiment Station, a circular by whom is noticed in *Experiment Station Work*, No. XLVIII., the group of diseases of maize known under the general name of dry rot has become of sufficient economic importance during the past four years to cause general concern among farmers in maize-growing areas in the United States. The name "dry rot" is derived from the way the cobs are affected in the field. In general the husks tend to turn prematurely yellow to sooty, and the cob becomes partially or wholly shrivelled and much decreased in weight. Sometimes the cobs remain upright with the husks closely adhering to them. In other cases the shanks are weakened and the effected cobs hang limp from their attachment, or the diseased condition may not be detected until the husk is removed.

The chief cause of dry rot is a fungus, known as *Diplodia maydis*. Cobs infected with this fungus "shriveled up more or less, darken in colour, and become light in weight. The kernels are also shrivelled, very brittle, and loosely attached to the cob." There are several other and less important forms of dry rot, due chiefly to fungi of the germs *Fusarium*. "In the case of the *Diplodia* disease, and quite probably in that of the other forms, the fungus perpetuates itself over winter on the old diseased ears [cobs] and old stalks. It is not usually difficult to find throughout the summer in old corn fields, where the disease has previously prevailed, many pieces of old cornstalks which are infected with the *Diplodia* fungus." Diseased cobs, we read, are fruitful sources of subsequent infection and should be removed as promptly as possible. "Keep them

in a separate receptacle, and burn them as soon as practicable. In addition to this, in fields where any considerable amount of disease has been found, the stalks should also have attention, whatever crop is to follow. Something may be gained by carefully ploughing them under and leaving them well covered, but burning may be required even if this is otherwise bad procedure. Such a field should not be replanted to corn [maize] for at least two years." If the first suggestion is always followed and the others are put into practice whenever necessity demands it, these serious losses may, it is stated, be practically prevented.

Co-operative Marketing of Citrus Fruits.

The November issue of the *Agricultural Gazette of New South Wales* contains some interesting notes, received from California, on the Co-operative Marketing of Citrus Fruits in the United States. The notes deal wholly with the rise and development of the great Californian marketing organisation—the Californian Fruit-Growers' Exchange. The Exchange, we read, was founded upon the theory that every member was entitled to furnish his *pro rata* of the fruit for shipment through his association, and every association its *pro rata* of the various markets of the country. The theory reduced to practice gives every grower his fair share, and the average price of all markets throughout the season. Another cardinal provision of the plan was that all fruit should be marketed on a level basis of actual cost, with all books and accounts open for inspection at the pleasure of the members. These broad principles of full co-operation constitute the basis of the Exchange movement.

The Exchange system is simple, but quite democratic. The local association consists of a number of growers contiguously situated, who unite themselves for the purpose of preparing their fruit for market on a co-operative basis. They establish their own brands, make such rules as they may agree upon for grading, packing, and pooling their fruit. Usually these associations own thoroughly equipped packing houses. All members are given a like privilege to pick and deliver fruit to the packing house, where it is weighed in and properly receipted for. Every grower's fruit is separated into different grades, according to quality, and usually thereafter it goes into the common pool, and in due course takes its percentage of the returns according to grade. There are more than eighty associations, the several associations in a locality uniting to form an Exchange, which serves as a medium, and to a certain extent as a buffer, between the associations and the general Exchange.

During the fourteen years of co-operation in the marketing of citrus fruits under the Exchange system, the output of the State has increased

from 4,100 in 1892-3 to 31,791 cars (including Northern California shipments) during the season of 1904-5, with a prospect of a still further increase in the volume of shipments in the very near future. Marketing the fruit for its growers at actual cost, the Exchange has been able to bring about a great reduction in packing and selling charges, with the result that the average cost per box of both packing and marketing oranges to Exchange growers has during recent years averaged around 35 cents as against 75 cents per box at the time the Exchange was organized, when the charges by speculative shippers for packing alone was 40 to 50 cents per box, to which was added 7 to 10 per cent. commission on the delivered price.

Capital is material used for the purpose of producing further material. Wealth is material used for satisfying wants. Thus, Capital may produce further Capital, or it may produce Wealth.

The preparation of potash as a by-product of sunflower culture is one of the industries of Northern Caucasus. The potash is prepared by lixiviation of ashes of the stalks, stems, leaves, etc., of the sunflower, evaporation of the solution, and calcination of the residue. Twenty-four factories in Caucasia in 1907 produced about 12,600 to 16,200 tons of potash. About one-fourth of the product is used in Russia, and the rest is shipped to foreign countries.

TICK PARASITE.—Officials of the Bureau of Entomology of the United States Department of Agriculture have discovered that certain kinds of stock-infesting ticks in Texas are subject to the attack of an internal parasite, and have signified their willingness to assist in getting this beneficial creature established elsewhere. In its adult stage the parasite (*Ixodiphagus texanus*) is a tiny winged insect, somewhat similar in appearance to the parasites which most commonly affect scale insects. It is not known yet whether or not it attacks the very common cattle tick of Texas, which is closely allied to the so-called Blue Tick of South Africa, but it has been bred from kinds in the same genera as the Dog Tick and the Brown Tick. No other true parasite of ticks has anywhere been discovered.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

* * *Under the above heading we propose to publish each month in future short paragraphs on subjects of interest to the practical farmer, by recognised experts in agriculture and allied sciences.*

A perfect rotation should include all those crops which the soil, climate, and situation of the farm will admit of being cultivated at a profit. The conditions which influence the species of crops grown are, (a) the nature of the soil, (b) the character of the climate, (c) the kinds of live stock kept, and systems of management, (d) the demand for certain crops and the convenience for marketing them.—*Prof. J. Scott.*

In general, it may be said that an abundant supply of phosphoric acid and potash, especially the former, tends to increase fruitfulness, hardness and firmness of leaves and stems, while an abundance of nitrogen has a tendency to produce just the reverse conditions; and while the plant cannot be at its best without a suitable supply of nitrogen, the plants which are grown chiefly for their fruits may be easily injured by an amount only slightly exceeding a sufficiency.—*Prof. I. P. Roberts.*

THE SITUATION OF THE FARM.

The situation of a farm—the altitude of it, the climate to which it is subject, the aspect, whether toward or away from the sun, and the shelter, whether natural or artificial, with which it is supplied—is of greater moment than many men seem to be aware of. A farm unfavourably situated in these respects is more or less cold, and therefore detrimental for stock, and will not produce herbage so varied, and plentiful, and nutritious as will be found elsewhere.—*Professor J. P. Sheldon.*

SPAYED AND UNSPAYED SOWS.

To the feeder, the buyer, or the butcher, unspayed sows are usually, in one way or another, a cheat, as they may weigh more than they are worth by having a litter of pigs in them, or may be utterly destitute of inside fat, from having recently suckled pigs; in either case they are of less value than their appearance would indicate. Spayed sows are not troublesome to their mates, are as good as they look for feeding or marketing, and command in all markets such prices as are paid for none but first-class stock.—*F. D. Coburn.*

BUILDING UP A DAIRY HERD.

With a limited capital it is a good practice to buy second-class cattle of the right sort, and "grade them up," to use an American term, by using good bulls. In this way a man's herd improves each year, after the first two or three, and he has the satisfaction of seeing it improve. Half the pleasure of farming is missing, to my mind, if a man's cattle are so good to begin with that he cannot improve them. Besides, if he buys second-class cattle at a second-class price, he invests a capital which, small to begin with, increases under his eyes, as the improvement goes on.—*Prof. J. P. Sheldon.*

TURNIPS FOR DAIRY COWS.

Butter has often a bad taste given to it through various causes, turnips, especially the Swedish variety, being the principal. By far the best way we know of to prevent turnips from giving their flavour to the milk, is to refrain from feeding the cows with this root *before* the milking, and give them turnips after the milking is finished, so that some hours will elapse before the milk is taken from them. Saltpetre put into turnippy-tasted milk is said to get rid of the taste. A tablespoonful per half gallon of milk of a solution of half an ounce of chloride of lime in a gallon of water, is also said to be a certain cure for bad-tasted milk.—*R. Scott Burn.*

TILLING POTATOES.

Almost invariably judicious cultivation of potato land is profitable. It is secondary to good preparation of the land. The object is not primarily to destroy weeds, although this may be a consideration. To-day intelligent farmers till to increase yield. Tillage is manuring . . . but in its entirety is not necessarily a good practice. Tillage destroys humus, and as this is one of the most essential constituents of a good potato soil, a rotation of crops is advised to aid in maintaining the supply. Tillage may be overdone, especially deep tillage in dry weather. During such a time only sufficient shallow tillage should be given to maintain a mulch. — *Samuel Fraser, Assistant Agronomist, Cornell University.*

SHEEP FOR MEAT PRODUCTION.

It is necessary for the particular disposition of flesh and fat production that the breathing power of the animal [sheep] should be limited, because a too conspicuous inhaling of oxygen expedites the decomposition of albumen, which would be detrimental to the flesh-production. The amount of inhaled oxygen is dependent on the amount of room allowed for the lungs for expansion. The more confined this is, the smaller are the lungs, and the consequence is that the

less oxygen can be inhaled. The activity of the lungs must be restricted in every way. A sheep, therefore, to be particularly adapted for flesh-production, must possess a proportionately small chest, which, of course, is invariably the case.—*Alfred Harkesworth.*

AGRICULTURE AND CAPITAL.

People will have it that agriculture does not "pay." It does not, very likely, on the old lines. But no calling pays better in small hands when there is plenty of money to work it with. Only, in all our callings—agriculture has been the last to learn the lesson—the rule of the present day is: you must have plenty of *working capital*. It is not the food which just supports the life of a beast which earns a profit, but the extra hundredweight of cake or meal which lays on the flesh and fat. It is not mere delving or ploughing of the soil that makes farming remunerative, but the manure put into it. And of such fertilising material the last bag or hundredweight earns a profit out of all proportion to that earned by preceding ones. . . . Of course, judicious employment must be taken for granted. But all knowledge and skill, all foresight and calculation will be thrown away if we have not got the money.—*Henry W. Wolff.*

THE VALUE OF STATISTICS.

Every advance in the perfection of statistics and the rapidity of collection makes more certain the bargain of every producer and consumer. People have sometimes opposed the gathering of statistics for fear that large dealers and speculators may take unfair advantage from such information. But a careful consideration will show that managing of the market depends chiefly upon want of information on one side of the bargain. If farmers were as thoroughly informed as to the crops of the world as carefully collected statistics might make them, no false rumours could mislead them in selling their produce. The evident tendency toward more stable markets, as shown by the records of the last twenty years, is accounted for partially, at least, by the more perfect information available. If farmers themselves would take interest in furnishing accurate estimates of the extent and condition of every product held for sale, they would in the long run reap the highest advantages of clearly understanding the supply and demand in the markets of the world. This would do more to destroy the demoralising force of mere speculation than any possible legal enactment.—*Geo. T. Fairchild, LL.D.*

The wealth of a community is judged by its fixed capital; its thrift by its circulating capital.

Correspondence.

THE ELAND AS A FARM ANIMAL.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In your last issue, under the heading "Notes and Comments," I read with interest your remarks about the eland and its value for draught power and beef. When travelling a few weeks ago in Rhodesia I met Mr. A. R. Jelliman, who is farming in the Maheki District, Mashonaland, and has had considerable experience in catching, training, and working the eland for draught purposes. He said that they were reliable, good workers, free from vice of any kind, and that he used them in his carriage in preference to horses. Mr. Jelliman was confident that the eland is the most valuable animal for work in South Africa, and expressed deep regret that they should have been allowed to be shot down as they have been in the past.

Mr. Sawyer deserves the highest praise for bringing to prominence the practically unknown value of the eland to farmers and the public generally.—Yours, etc.,

G. L. COVENTRY.

Acton Homes.

"VAPORITE" FOR MEALIE GRUB.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—When sending me a consignment of their celebrated fertilizer in the spring of 1906, the South African Fertilizers Co., of Durban, kindly gave me a pocket of Vaporite, which was supposed to kill the ground-grub or cut-worm. As I am not much bothered with this grub I had no opportunity of giving the Vaporite a trial, but when the time came for the top-grub (which are always bad on my farm) I gave the Vaporite a trial, and was so pleased with the result that I ordered 200 lbs. and, so as to give it a fair trial, I distributed a lot of it amongst my native tenants, who were much surprised at the way it killed the grub, and wherever I tried it myself it always proved most effective. In November, 1906, a plague of caterpillars cleared 4 acres of sweet potatoes and I did not think of trying Vaporite on them. However, two months later, after the potatoes had made a second growth, the caterpillars returned, when I gave them a light dusting of Vaporite, and two days after I found the pest had cleared.

Last year I tried Vaporite on the beetle pest eating the bloom off

the beans with splendid effect, but the best proof is to be seen in an eight-acre field of mealies which are looking just perfect at the present time which were one mass of grub early last December, but a light application of Vaporite cleared the grub.

I also put a small quantity of Vaporite in a small bag of mealies to see if it would keep out the weevil. Twelve months after I opened the bag and found every mealie sound and not a single weevil in the mealies. I am also of opinion that Vaporite is a splendid disinfectant, and during the Horsesickness season it would be well to have some in small, open tins in parts of the stable. This spring I had an opportunity of trying Vaporite on the ground-grub, which was most satisfactory. I intended sending you the result of my trials with Vaporite last year, but wanted to be quite sure before doing so, and now, after using it for two seasons, I am perfectly satisfied with its effectiveness, and shall get a supply every spring in the future.—Yours, etc.,

WILLIE NICHOLSON.

“Thedden,” Richmond.

NOTTINGHAM ROAD HORSE FAIR.

TO THE EDITOR OF THE “AGRICULTURAL JOURNAL.”

SIR,—The Nottingham Road Farmers’ Association has every reason to feel gratified at the result of their initial horse fair held here on 18th November. The effort was successful in drawing buyers from all over South Africa, and, whilst a few reserves were too high, bidding was brisk, and horses to the value of £1,200 changed hands. The demand all through was good, showing the fair has filled a want, and the Association is in hopes a permanent market for horses has been established in this district, second to none in the Sub-continent, for the breeding and rearing of such. At the above sale, hacks realised up to 30 guineas, carriage pairs in harness up to 59 guineas, draught pairs in harness up to 50 guineas, entires up to 30 guineas.

These horse fairs are to be held every six months, the next one taking place in May, 1909. We are also holding a stallion sale in August, 1909.

Thanking you for the courtesy of the insertion of this in your widely read pages,—I am, yours, etc.,

WILLIAM WOOD,

For Horse Fair Sub-Committee of Nottingham Road
Farmers’ Association.

“Woodfield,” Nottingham Road, Natal.

[We refer to the above matter in our “Notes and Comments” in this issue.]

MOLASSES FOR HORSES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In your December number we read the interesting article, "Molasses for Horses."

We beg to point out to you that in America the conditions are not at all the same as in Natal. Where you can give 15 lbs. of crude molasses to a horse in America, such quantity would produce colic in Natal stock.

To prevent this, molassine meal was brought out, and with its antiseptic properties absolutely prevents colic.

The demand for molassine meal is so great in England that we have not only shipped the meal from here, but also hundreds of tons of treacle to be used for the manufacture of this molassine meal. Last year the sales in England amounted to 180,000 tons, and it seems a pity that Natal farmers are so slow in recognising the value of this meal.

We beg to enclose a brochure by Col. Nunn, the late P.V.O. of the British Army in South Africa, on sugar foods, which may be of interest to you and your readers.—Yours, etc.,

R. A. EBSTEIN,
Managing Director, The Molassine Co.
(South Africa), Ltd.

A WEEKLY AGRICULTURAL PAPER FOR NATAL.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—For the past twelve months I have been a subscriber to the *American Agriculturist*, and many a time it has occurred to me that we farmers in Natal should be able to support a "weekly" issued on similar lines. I can hear you say, Yes! they don't support the present monthly journal sufficiently let alone a "weekly" one. But my contention is that if the present *Agricultural Journal* were altered into a weekly paper the increase in advertisements as well as increased subscriptions would cover the extra cost of production. At present the advertisements of your *Journal* are mostly "standing ads." from local firms. If we could get a weekly paper I think that every farmer who at present takes the *Journal*, and many others, would be prepared to pay 3d. per copy, i.e., 13s. per annum, for the advantage of getting his farming news weekly, and reading over the "fresh" advertisements which would appear in your columns under the headings of "Wanted," "For Sale or Exchange," etc. At present if the farmer wants to advertise his poultry, stock, or produce, he has to resort to several insertions in a "daily," and, owing to

the expense, he cannot always afford to place his "ads." in all the Durban and Maritzburg "dailies," and has to choose one only, and run the chance of a possible purchaser taking that particular paper. Then, again, the weekly reports as to how the crops in various districts are faring, and the market values of stock and produce, etc., would indeed be a boon to the producer as well as the consumer.

The Experimental Farms could be prevailed upon to give a *weekly* summary, and from time to time they might suggest to advantage the growing of certain sorts of crops in certain localities and soils, a subject which would be of service to all agriculturists.

I think that with a little persuasion from you through your columns, or in some instances at first you might have to resort to a personal letter, you could prevail on one farmer in each district to give you a *weekly* report as to how the crops, etc., were progressing in his district. This is the American system and a good one.

At present we receive the *Agricultural Journal* once a month. We read it through in an evening, it is then put away with the rest, and by the time the next one arrives we have practically forgotten the contents of the last one.

I must admit that your *Journal* as a monthly is excellent, and if we can support a "weekly" as well as a monthly so much the better; but if not, then I say that the *Agricultural Journal* turned into a weekly paper at a correspondingly higher rate of subscription would command far greater support than it at present does; and with these few remarks I will leave my subject in the hands of those it most interests.—Yours, etc.,

A FARMER.

CAUSTIC SODA AND SULPHUR DIP.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Anent the recent discussion as to the merits of the Caustic Soda and Sulphur Sheep Dip, I enclose copy of a letter from Mr. T. H. Moore, of Messrs. Moore Bros., the well-known wool merchants and experts, of Huddersfield.

I would again draw the attention of farmers and wool dealers to Government Notice No. 1068, dated 8th September, 1908, issued by the Agricultural Department, Capetown, *viz.*:—

"The Government has decided to abolish the list of approved dips which has hitherto been published from time to time. The approval of the Department of ingredients for the eradication of Scab will in future be confined to:—1. Flowers of Sulphur; 2. Caustic Soda."

This notice is practically identical with the circular issued by the

Department of Agriculture for the Orange River Colony in September, 1907.

The approved formula for making sheep dip is:—5 lbs. Powdered Caustic Soda, 98/99 per cent. ("Thistle" brand); 20 lbs. Flowers of Sulphur (Brandrams, or equally good); 100 gallons water.—Yours, etc.,

M. S. PRICE.

The following is the letter from Mr. T. H. Moore referred to:—

"M. S. PRICE, Esq., P.O. Box 689, Capetown.

"Dear Sir,—Please accept my thanks for the reprint from *Cape Times* which you have so kindly sent me.

"Later experience of wool which has been subjected to the Soda and Sulphur Dip only confirms the opinion expressed in my report to the Government of the O.R.C., dated September 5th, 1907. Notwithstanding all that has been said in the Press and on the platform, I am quite satisfied that no farmer need fear any injury to his wool through using the dip in the manner recommended by the Government.—Yours truly,

"T. H. MOORE."

ALOE CULTIVATION IN NATAL.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I am afraid I cannot altogether agree with the contribution on "Aloe Growing," furnished by Mr. Leonard Acutt. It is a pity this gentleman did not add to his quota of knowledge, derived from his tour through Mauritius, by visiting the Aloe Estates in Natal. Comparison could then have been made, and useful information disseminated amongst those who are interested in fibre production.

The latter is a new industry in this country, and we have to grope somewhat in the dark in search of many important facts bearing on the growth of the *Furcraea*, but we are slowly learning useful lessons, which should be of benefit to us and others who embarked in this venture.

In the light of what we already know, I should therefore be sorry to see Mr. Acutt's suggestions taken up by the public, and the Aloe treated here as a weed, to be strewn broadcast on rocky ridges, and sterile slopes, over millions of unproductive acres! This proceeding would be the sure prelude to absolute failure, and Aloe-growing, already depressed by reason of various wild-cat schemes now happily defunct, would receive a set-back for years.

Fibre exported from Mauritius is appraised at a very low figure on the London market, and ranks mostly as tow, worth anything from £18 to £22 per ton. This is not surprising, considering the little cultivation, or proper treatment, given to the plant there during its growth, and in this connection I may say here that a well-known London buyer on

being shown a sample of clean and carefully brushed *Furcraea* fibre from Natal, would scarcely credit that it was "Mauritius hemp," stating that it was altogether superior to the island productions, and would be worth at least £10 a ton more. The moral of this is: The Aloe plant is in no sense different from tea, sugar, or wattles, and obeys the same invariable law, which is, that it responds to high-class cultivation and attention in an equally high ratio, and depreciates to the same extent when it is treated as a weed and forced to take its chance, bereft of any kindly husbandry.

Were your contributor to inspect our plantations in this county, we could bring these facts home to him, as they have been impressed on us, by dint of practical experience. This question of cultivation is one of the most useful lessons we have learnt, and another one is, that though Aloes may eke out a miserable or stunted existence on rocky plateaus, or where the soil is sandy and barren of constituents necessary to ordinary plant life, they fully appreciate good and rich soils just as other crops do, and cannot be classified with the Wild Aloe (*Umhlaba*). The latter was no doubt in Mr. Acutt's mind when he penned his article, which we submit was based on wrong premises.

When it is considered that, at the best, 100 lbs. of Aloe leaves will give not more than 4 per cent. of clean fibre, the vital necessity of the plantations being concentrated within as close an area as possible to avoid costly transport to the factory will readily be seen, and the futility of the suggestion to broadcast the bulbils over tracts far apart will also be appreciated. The neglect of this very important fact was the main cause of the collapse of at least one Aloe company in this district.

We wish to give due credit to your contributor for his well-meant and patriotic ideas for furthering the fibre industry in Natal, but as we are convinced that they are erroneous, and may do harm instead of good to the latter, we are impelled to state that Mr. Acutt's experience on the important points alluded to differ widely from our own.—Yours, etc.,

MANNING & COLLISON,

Per CLAUDE MANNING.

The best seed maize is gathered by taking the best cobs from the best stalks in the best hills. Go through the field early and make your selections.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of December, 1908:—

COLLIERY.	Average Labour Employed.					Output.
	Productive Work.			Unproductive Work.*	Total.	
	Above Ground.	Below Ground.	Total.			Tons. Cwt.
Natal Navigation ..	379	658	1,037	15	1,052	32,397 0
Elandsiaagte ..	346	629	975	18	993	17,664 11
Dundee Coal Co. ..	294	445	739	33	772	13,507 18
South African ..	126	311	437	64	501	13,221 15
Natal Cambrian ..	195	360	555	—	555	11,467 10
Glencoe (Natal) ..	213	453	666	64	730	11,414 9
St. George's ..	254	412	666	—	666	11,223 0
Durban Navigation ..	161	356	516	—	516	11,125 0
Talana ..	119	340	459	12	471	7,087 17
Newcastle ..	88	414	502	—	502	6,785 17
Natal Steam Coal Co. ..	85	215	300	15	315	5,415 12
Hatting Spruit ..	90	136	226	25	251	3,687 12
Ramsay ..	93	216	309	20	329	3,387 2
West Lennoxton ..	67	129	196	—	196	2,800 1
Central ..	39	71	110	—	110	1,147 17
Zululand ..	35	25	60	—	60	689 0
Hlobane ..	—	—	—	431	431	355 13
Nooitgedacht ..	2	3	5	—	5	10 0
Vaalbank ..	—	4	4	4	8	3 0
Dumbi Mountain ..	2	—	2	—	2	2 0
Totals ..	2,587	5,177	7,764	701	8,465	153,342 14
Corresponding month, '07	2,629	5,463	8,094	208	8,302	160,684 12

	Productive Work.			Unproductive Work.	Total, Dec., 1908.	Total, Dec., 1907.
	Above Ground.	Below Ground.	Total.			
Europeans ..	185	137	322	88	410	404
Natives ..	880	3,345	4,225	527	4,752	4,240
Indians ..	1,522	1,695	3,217	86	3,293	3,658

* Cost Charged to Capital Account.

Mines Department, Maritzburg, 9th January, 1909.

CHAS. J. GRAY,
Commissioner of Mines.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of December, 1908:—

Bunker Coal ..	..	..	..	Tons.	Cwt.
Coal Exported ..	..	..	..	60,837	0*
				49,012	4
Total				109,849	4

* Includes 20 tons 0 cwt. taken by H.M. Warships.

* „ 1,522 „ 3 „ „ „ Troopship.

Customs House, Port Natal, 4th January, 1909.

GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	T. Kirkness ..	Coalfontein
A. B. Koe ..	Portion of Estcourt	Lungsickness	W. Wright ..	Maggiesdale
A. C. Williams ..	Utrecht ..	Scab	R. Maitson ..	Calcote
			C. Tante ..	Waterhoek
			B. & H. Hattingh	Dageraad & Welgeon
			P. Delport ..	Mooispruit
			L. Schewekkar ..	Kalkrantz
			M. Prinsloo ..	Waterv. J.
H. Van Rooyen ..	Ba'anango ..		Macholo ..	Driefontein
			W. Havemann ..	Langfontein
			Mgantge ..	verdie d
			M op ..	
			W. Liveisag ..	Langfontein
			Uyang ..	verdie veld
			Kouksa ..	Vaalbank
			Ngeta ..	Pandasgrop
J. G. Speirs ..	Impendhle ..		Pinda, Vete & Sobuon	Furth
L. Trenor ...	Alfred ..	Lungsickness	Hitchins Bros. ..	Thleku
		Scab	Silwana ..	L cation
			Yalwayo ..	
		Lungsickness	Dumas ..	Location
			M'Yango ..	Ihluku
			Busak ..	Izingolweni
			G. L. gan ..	T and No. 12
			J. Ma. gan ..	
			Guhlano ..	Location
			Pelusa ..	
			J. Fynn ..	
			M'Nyango ..	Thluku
			Uy mbi ..	Location
			Motshwa ..	Msingopansi's Kraal
			Hogg Bros. ..	St. Mary's
			M. Clothier ..	Slexcel
			T. m Fyn ..	
			E. M. Etheridge ..	Selhurst
			John Ryan ..	Norburg
			A. Fynn ..	Pande Kraal
			M. C. Zietman ..	Ikayolami
			H. M. Raw ..	Orange Grove
			Majavus ..	T. Fynn's Location
			J. S. Payn ..	Phoenix Park
			J. J. Oo-thuis ..	The Gorge
			J. H. Payn ..	Burnside
			Byel's Kraal ..	T. Fynn's Location
			H. M. Raw ..	Eland - Drift
			Byelus ..	T. Fynn's Location
			Elij h ..	She pwalk
			Mashuma ..	Hole
			R. Fann ..	Blackwater
			F. Mitz ..	Lot 1, Enquabeni
			E. Mizi ..	Lot "F", Enquabeni
A. S. Parkinson ..	Lion's River ..	Scab	J. T. Clothie ..	Whiteciff
			A. C. Thomson ..	Lion's Bush
C. T. Vang. an ..	Paulpietersburg ..		R. Greene ..	Mansfield
			P. Allen ..	Welverdiend
			C. Labusch gne ..	Pivaan
			W. F. Mufross ..	Blinkwa er
			J. B. Rudolph ..	1 osc i Krans
			M. Creig ..	Elandsberg
E. Wingfield-Stratford	Newcastle ..		Tom Llan e ..	Struisvogel Kop
			G. van Niekerk ..	Rattlekloof
			R. P. Botha ..	Lekkewater
			M. Katzenstein ..	Town Lands
C. E. Walker ..	Portion of Estcourt	Lungsickness	H. (adle and others	Set fontein
		Scab	Thos. Hindle ..	W low Grange
		Lungsickness	N. C. H. Little ..	Leighton
G. Daniell ...	Vryheid ..	Scab	Hlomvendluni ..	Du blerecht
			J. M. Koek more ..	Hardetaald
J. R. Cooper ..	Nkandhla & Ngutu		K. Umsinengo ..	Mquzini
			L. Mloyi ..	M gabeni
			S. Mboyi ..	Mqazini

RETURN OF FARMS UNDER LICENCE (*Continued*).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
J. R. Cooper ..	Nkandh'a & Nqutu	Scab	R. Bunting ..	Nqudeni
		"	S. Molife ..	Iljadu
		"	M. Malagwano ..	Blood River
		"	Langa ..	Batshi
		"	Linjaza ..	Telezi Hill
		"	L. Molife ..	"
		"	H. Sutton ..	Masinkoms
		"	Westbrook Bros. ..	Dawin
B. Klusener	Port Shepstone ..	"	B. Scott ..	Murchison
E. Varty	Western Umvoti ..	Lungsickness	Mabija	"
		"	H. Hunsmeier ..	On Rust
		Scab	W. J. Slatyer ..	Holm Lacy
		"	P. H. Van Rooyen ..	Thorn View
		"	P. H. Van Rooyen ..	Burrie's
K. Ripley	Emtjaneni ..	"	T. J. Martens ..	Groenkop
		"	Nhlangana ..	Mangwaza M.S.
		"	Baleni ..	Mfuli M.S.
		"	Janga ..	Mangwaza M.S.
		"	Patikali & David ..	Rus everwreht
		"	Ndatmbi ..	"
		"	Uzwe'njani ..	"
A. Hair	City and Umgeni ..	"	P. wel ..	"
J. F. van Rensburg	Ngotshe	"	Unjabo ..	Zwaartkop Location
		"	Jakob ..	Zalager
		"	T. C. Va Rooyen ..	Welkom
		"	Simon ..	Smaadell
J. Stewart ..	Bergville	Lungsickness	F. K. Stockie ..	W. I. Vlei
E. W. Larkan ..	Umsinga	Scab	J. J. Strydom ..	Hester
		"	T. H. De'ekuid ..	omerset
		"	Am s Nahlovu ..	Nazareth

MANGE IN HORSES EXISTS AS UNDER

Owner.	Farm.	District.
Pinda, Vete & Sobuon ..	Strathson	Impendhle
Natives	Olivefonte	Umvoti
Natives	Tetworth	Lion's Riv
Natives	Spitzkop	Vryheid

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, B. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umiazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of December, 1908.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain-fall in 1 day.		Total for Year from July 1st, 1908.	Total for same period from July 1st, 1907.
	Maximum.	Minimum.					Fall.	Day.		
Observatory ..	81.9	67.2	88.7	61.6	3.45	19	.92	7th	19.62	19.28
Stanger ..	84.4	67.6	103	62	5.02	19	1.44	6th	20.90	22.66
Vettriah ..	86.7	66.8	97	61	4.06	16	1.40	22nd	20.66	19.79
Greytown ..	82.9	54.6	98	48	4.26	16	1.15	1st	19.37	18.70
Lidgettton ..	81.8	55.1	95	43	3.96	17	1.08	22nd	17.43	—
Estcourt ..	87.7	58.1	98	50	1.78	10	.35	1st	12.88	13.38
Bulwer ..	—	—	—	—	7.50	20	2.12	22nd	26.67	22.74
Ikopo ..	—	—	—	—	3.07	15	.69	22nd	18.83	—
Mid-Illovo ..	79.9	60.0	97	53	3.80	16	.67	7th	21.33	21.06
Port Shepstone ..	83.9	61.2	90	55	3.63	11	.75	4th	24.56	18.70
Umzinto ..	88.1	59.2	100	55	2.82	11	.84	6th	21.59	17.83
Richmond ..	79.7	58.2	97	53	6.08	19	1.20	6th	24.99	23.95
Maritzburg ..	83.0	59.9	102	51	3.50	17	1.10	22nd	16.18	19.81
Howick ..	81.0	57.8	93	47	3.89	16	.85	22nd	17.57	21.31
Dundee ..	87.4	59.3	95	51	5.60	10	2.42	7th	18.19	18.57
Weenen Gaol ..	96.5	59.8	107	52	2.57	14	1.08	21st	15.39	13.69
Charlestown ..	78.4	53.3	85	45	3.86	15	.85	12th	17.43	17.54
New Hanover ..	86.7	59.5	100	50	3.72	16	1.26	22nd	20.31	22.12
Krantzkloof ..	79.0	62.3	91	56	3.49	9	.64	7th	20.05	—
Krantzkop ..	87.8	70.0	95	64	3.72	13	1.05	29th	15.55	—
Nqutu ..	80.2	53.3	89	47	5.88	10	1.48	28th	18.76	14.25
Vryheid ..	88.5	58.0	101	51	4.41	10	1.20	23rd	21.40	19.20
Mtunzini ..	86.9	—	101	—	6.55	10	1.76	17th	30.98	29.18
Hlabisa ..	82.6	62.5	92	55	4.86	10	.85	16th	20.07	18.40
Ubonbo ..	85.4	62.4	100	55	6.00	7	2.37	30th	20.85	19.35
Point ..	—	—	—	—	5.35	19	1.67	6th	24.08	22.54
Mahlabatini ..	83.5	49.7	92	46	5.00	10	1.68	6th	16.98	17.20
Empangeni ..	88.5	64.5	102	56	4.00	3	2.54	3th	21.82	20.98

Meteorological Observations taken at Private Stations for Month of December, 1908.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).		RAINFALL (IN INCHES).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain-fall in 1 day.		Total for Year from 1st July, 1908.	Total for same period from July 1st, 1907.
					Fall.	Day.		
Adamshurst ..	99	45	2.96	14	0.5	26th	14.51	17.01
Hilton ..	92	50	4.50	21	0.78	22nd	18.34	21.77
P. M. B., Botanical Gardens ..	—	—	4.8	15	1.2	22nd	17.45	—
Mount Edgecombe ..	—	—	2.24	11	0.59	23rd	21.47	23.43
Cornelia ..	—	—	3.4	—	—	—	—	—
Minkwood Kraal ..	—	—	1.17	—	—	—	—	—
Blackburn ..	—	—	3.26	—	—	—	—	—
Saccharine ..	—	—	3.15	—	—	—	—	—
Equefa ..	96	5	4.00	16	1.05	11th	22.81	22.56
Umzinto, Beneva ..	—	—	4.13	14	1.02	10th	21.50	22.30
Riet Vlei ..	—	—	3.07	12	1.40	22nd	14.43	14.9
Bransholme ..	—	—	7	17	1.35	23rd	29.42	40.1
Winkel Spruit ..	84	60	3.76	15	0.67	6th	21.31	23.06
Umhlangeni ..	90	—	4.95	14	1.88	11th	25.51	—

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 3RD FEBRUARY.

Ashley (Ixopo Division).—(1) Black ox, white on belly, four white feet. (2) Running on the farm Murchison, and reported by Mr. Peel as being too wild to be driven to the Pound at Ashley. Bay gelding, about 15 hands, off hind foot white stocking, near hind foot small white patch, a V shaped piece cut out of each ear, small star, and slight blaze, two old scars on back, harness marks on chest.

Estcourt.—(1) Six Kafir goats, no marks. (2) Three Kafir goats, no marks.

Ingogo.—Found straying by Natal Police, Spitzkop, and at present running on Natal Police Ground :—Sheep, ewe, very old, branded C.F. This sheep suffers from a broken leg, and is consequently very lame, and cannot be driven to the pound.

Muden.—(1) Black goat, no marks. (2) Black kid, no marks.

Woodstock (Bergville Division).—Chestnut mare, white star on forehead, right hind foot white, long tail and mane.

ON THE 17TH FEBRUARY.

Geytown.—Black ox, branded Z.S. (Impounded December 4th, 1908, by Mr. S. C. Van Rooyen, Greytown).

Hatting Spruit.—(1) Two white Kafir goats, ewes, tip off right ear, V out tip of left ear. (2) Black Kafir goat, ewe, tip off right ear and slit in front, V out tip of left ear.

Mooi River.—Running on the farm "Clifton," Willow Grange, and reported by Mr. H. D. Swan, Cross-bred merino ewe and lamb, grey face, and horns, both ears cut off, very indistinct brand on ribs.

Muden.—Two young black pigs, about three months old.

Nqutu.—Bay horse, gelding, black points, about 13 hands, has had a very bad saddle sore, barbed wire cut mark above knee, near side fore leg, in very poor condition, no brands.

Utrecht.—(1) Mouse coloured horse, star on forehead, 14 hands, 3 years old, near front foot white, two white hind feet, no marks or brands. (2) Black horse, 14.2, 8 years old, sore back, tail cut square, no marks or brands.

ON THE 24TH FEBRUARY.

Vryheid.—Impounded on Mr. Macleod's farm, and reported as too wild to be driven to the pound at Vryheid, grey stallion, about 13 hands.

ON THE 3RD MARCH.

Ashley (Ixopo Division).—Bay Gelding, about 14.2, star, near hind fetlock white, slit in right ear, branded — on left leg.

Dundee.—(1) Ewe sheep, branded M on right flank. (2) Lamb of foregoing.

Good Hope (Klip River Division).—Grey gelding, branded A.P. on left hind quarter, right front leg swollen at knee as if previously broken.

Howick.—Running on the farm Groote Vallie, and reported by Mr. G. Houston as too lame to be driven to the pound. Bay gelding, about 15 hands, aged, branded R on near hip, and shod all round.

Richmond.—Black pig (sow).

Woodstock (Bergville Division).—Running on the farm "Zuur Laager," and cannot be driven to the pound owing to the East Coast Fever Regulations, and reported by J. Halferty. (1) Black and white cow, two swallow tails on right ear and one swallow tail on left ear. (2) Red bull calf, calf of the above, two swallow tails on the right ear and one swallow tail on the left ear.

Government Laboratory.

SCALE OF CHARGES FOR ANALYSES, VACCINES, ETC

The following is the scale of charges fixed for analyses, etc., at the Government Laboratory, Al erton, Pietermaritzburg : -

	£	s.	d.
Drinking-water Analysis :			
Chemical	2	2	0
Bacteriological	5	5	0
Milk, Analysis	0	10	6
Sputum, Bacterioscopic examination	0	5	0
Biological test for Tubercle	1	1	0
Throat-swabs for Diphtheria (prepared swabs obtainable on application) :			
Bacteriological Report	0	2	6
Urine, ordinary clinical examination	0	5	0
Quantitative estimation of glucose	0	10	6
Biological test for Tubercle	1	1	0
Fæces, for Ankylostomiasis	0	2	6
Blood (collecting outfit obtainable on application) agglutination test for Typhoid (Widal, Paratyphoid, Malta Fever, etc.	0	5	0
Tumours and Morbid Tissue :			
Microscopic examination 10s. 6d. to	2	2	0
Post Mortem examinations 10s. 6d. to	5	5	0
Toxicological examinations 10s. 6d. to	21	0	0
X-ray examinations, blood-counts, etc., by special arrangement.			

The following sera, vaccines, etc., are issued at the prices indicated :—

	s.	d.
Anthrax Inoculation, per double dose of two inoculations ...	0	6
Anti-Diphtheritic Serum, per dose	5	0
Anti-Streptococcic Serum, per dose	2	0
Anti-Tetanic Serum, per dose	2	0
Mallein, per dose... ..	0	4
Tuberculin, per dose	0	4
Anti-Venene (for snake bites), per dose	5	0
Blue Tongue Vaccine, per 25 doses	2	0
Blue-Tongue Curative Serum, per 50 cub. c.	2	6
Quarter Evil Vaccine (in five and ten dose packets), per dose	0	3
Q. E. V., Double Inoculation, per dose	0	6

Appliances for inoculations, syringes, etc., are also supplied from the Laboratory.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 110.—Englishman, 39 years of age, gardener by profession, with knowledge of farming, desires employment on a farm. Appears to be a steady and reliable man.

No. 111.—Married man, 36, no children, desires managership of farm. Spent five years with Capt. Hayes, and is well acquainted with the management of horses, including racing horses. States he has sound veterinary knowledge and understands dairy, poultry, pig, and stock farming generally. South African experience, four years Cape Colony and one year Impendhle Division, Natal. Is prepared to work for month or two for board and lodging to prove capabilities, provided sound opening at end of that time.

No. 113.—Age 27, desires to obtain a start on a farm in Natal. Came to South Africa six months ago; attended the preliminary classes at the Glasgow and West of Scotland Agricultural College, and has also obtained a certificate for Theoretical Agricultural Chemistry. Is steady, and would be willing to work without any salary in order to obtain a practical knowledge of farming.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

	Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
			Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300 lbs. weight.	Over 300 lbs. weight.
1. Receiving per head	s. d. 0 3	s. d. 0 6	s. d. 0 6	s. d. 0 6	s. d. 0 3	s. d. 0 3
2. Killing and Cleaning "	2 3	3 6	2 9	3 3	2 6	3 0
3. Labour "	0 3	0 6	0 3	0 6	0 3	0 6
4. Disinfectants "	0 1	0 1	0 1	0 1	0 1	0 1
5. Bagging (4 Quarters) per body	1 9	3 0	2 6	2 9	2 3	2 6
6. Cleaning of Tripes each	0 6	0 6	0 6	0 6	0 6	0 6
7. Chilling of Beef, up to 72 hours or portion thereof per body	1 0	2 9	2 0	2 6	1 9	2 6
8. Chilling of Offal, up to 72 hours or portion thereof per set	1 0	1 0	1 0	1 0	1 0	1 0
Chilling and Freezing Beef—						
9. 1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10. 2nd " " " " "	1 0	4 0	3 3	3 6	3 3	3 3
11. 3rd and remaining weeks or portions thereof "	0 8	3 0	3 0	3 0	3 0	3 0
Chilling and Freezing Offal—						
12. 1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13. 2nd " " " " "	1 0	1 3	1 0	1 0	1 0	1 0
14. 3rd and remaining weeks or portions thereof "	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars, apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

East Coast Fever Advisory Committees.

(NOTE.—Owing to sparse European population, the following Magisterial Divisions have no Advisory Boards: Ubombo, Mapumulo, Ingwavuma, Mahlabatini, Ndwandwe, Nkandhla and Hlabisa.)

ALEXANDRA.—Chairman: W Thompson, Umzinto. Members: H Bazley, R C Archibald, A Blamey, H Reynolds, G J Crookes, R Parkin, J A Curle.

ALFRED.—Chairman: Magistrate. Members: A G Prentice, Rev. S Aitcheson, J E Brown, F H Boddy, H M Raw, H Rethman, H C Hitchens, H J R Hatchwell, W P Bouserie.

BERGVILLE.—Chairman: T E Zunkel, J.P., Bergville. Members: P H Van der Riet, J G Fannin, H Jackson, C Halferty, F Zunkel, Mbulali—Consulting member for natives.

BULWER.—Chairman: Magistrate. Members: R Comrie, Wm Colville, R Gordon, H Cole, P Garson, P McKenzie, G Malcolm, H C Gold, R Justice, E Stafford, W Little.

CAMPERDOWN.—Chairman: A N Kirkman, Cato Ridge. Members: J E Erfmann, P J Kingham, W B Turner, C J A Scheepers, W Mercer, L G Wingfield Stratford, J W Harvey, B B Evans, J W V Montgomery, B R Buchanan, W L Stead. **SUB-DIVISIONAL BOARDS.**—No. 1. *East of Railway Line from "Spitzkop" to Railway Line.*—Chairman: J F Erfmann, Cato Ridge. Members: P J Kingham, H Dinklemann, F L Meyer, J H Meyer, H A Meyer. No. 2. *East of Railway Line from West of Government Fence.*—Chairman: C J A Scheepers, Thorneybush. Members: W B Turner, W Mills, J F Scheepers, H Nadauld, G S Phipson. No. 3. *West of Railway Line from Koning Krantz to Killairney and along Umlaas River.*—Chairman: A N Kirkman, Clairmont. Members: W Mercer, W Brown, R Godfrey, W S Meyer, E W Meyer. No. 4. *West of Railway Line, rest of Division between Main Line, Umlaas River Boundary of No 3.*—Chairman: W L Stead, Thornville Junction. Members: F H Meyer, J R Schwegmann, W E Schwegmann, W S Crouch, B R Buchanan (Hon. Sec., Manderston). No. 5. *West of Main Line, Beaumont, East of Main Mid-Illovo River from Westley's Drift to Umgwaranta River.*—Chairman: J W Harvey, Camperdown. Members: L G Winzfeldt Stratford, R Lyne, C A Hutton, E H Hayes, F E Groom. No. 6. *Mid-Illovo West of Line, rest of Division South of Umlaas River.*—Chairman: B P Evans. Members: J W V Montgomery, J H McCullough, J Ballam, J James, H S Power.

DUNDEE.—Chairman: F Turton, Glencoe Junction. Members: J Campbell, J J Grove, H Wiltshire, G M De Waal, Aug Jansen, A J Potgieter, A Cronje, A Schuid, H Greenhough. **SUB-DIVISIONAL BOARDS.**—*Glencoe Sub-area.*—Members: F Turton, H Greenhough, W H Miller, F Schroeder, V Marshall, J Lausen, J J De Jager, Rev Father Rauch (Native interests). *Hatting Spruit Sub-area.*—Members: J J Grove, H A J Davil, A E Norman, J Campbell, Rev J Dewar (Native interests). *East of Helpmakaar Road.*—Members: A M Cronji, D C Pieters, P Meyer, J A Naude, A Jansen. *West of Helpmakaar Road.*—Members: A J G Meyer, A P Lund, D C Uys, A J Van Tonder, Jun, A J Potgieter. Members of Joint Committee for Area West of Helpmakaar: A J Potgieter, A P Lund. Members of Joint Committee for Area East of Helpmakaar: A Jansen, A M Cronji. *Area between Main Vryheid Railway Lines.*—Members, W Craig, H Wiltshire, C M Meyer, Sen, A Spies, Jun, C M De Waal.

DURBAN BOROUGH.—Chairman: E L Acutt, Durban. Members: H R Bousfield, R Benningfield, G Swales, J Haynes, — Arthur.

EMTONJANENI.—Chairman: Magistrate. Members: F W Smith, H J James, F W White, A W Symmonds, R J Ortlepp, D C Uys, L J Van Rooyen.

ESHOWE.—Chairman: A Boast, Magistrate. Members: A Moore, G H Hulett, C F Adams, T Parkins, A T Wantink, F J Dickens, H H Thole.

ESTCOURT.—Ward 2. *East of Main Line.*—Chairman: A Stuart. Members: Magistrate, J Ralfe, J W Haw, J G Hatting, A Peniston, A B Haviland, G M Rudolph. Ward No. 3. (Boundaries): The Bergville Magisterial Division, Tugela

to junction of the two Tugelas; The Winterton Settlement fence to Vaai Plaats fence and Ovington and Sibhamie's Location fence, and from there to Government Game Reserve).—Chairman: H J De Waal, Glenisla. Members: R Gray, M Sanderson, R J Land, A Spearman, H L Bacon. *Ward No. 4* (Estcourt West of Railway Line; follow Bushman's River as far as Mr. Kerr's farm, then Nalaara's Location fence as far as Game Reserve).—Chairman: R H Ralfe. Members: F C Schiever, J Rencken, W Couch, P Male, T L Fyvie, J Hatting, A W J Hatting. *Ward No. 5* (Boundaries: Remainder of District West of Line).—Chairman: H Blaker, Estcourt. Members: W Comins, E B Griffin, H A Woodruffe, Col. Crompton, J Russell, A C Robinson, Jun, A E Downing, A D Shaw, J W Bentley.

GREYTOWN.—Chairman: Paul Hansmeyer, Greytown. Members: D Havemann, A Newmarch, J A Nel, W T Slatter, A T Handley, H S Botha. *Central Board*.—Chairman: P Hansmeyer, Greytown. Members: J A Nel, A Newmarch, W J S Newmarch, T K Taylor, S W Cadle, R J Van Rooyen, E J Van Rooyen, J G Nel.

INANDA.—Chairman: C R Bishop, J.P., Umgeni. Members: R Harrison, W Sykes, Jun, E Dore, W Campbell, R Armstrong.

KLIP RIVER.—No. 1 (A line from Elands Laagte along the Matawaans and Jononos Kop to the Berg; North line, Dundee boundary: all West of Main Line).—Members: C Mitchell Innes, R M Gray, L Meyer, J C Henderson, C Allen. No. 2 (O.R.C. line and boundary No. 1). Members: D Bester, A J Marais, W Allison, J Bester, — Brink. No. 3 (From Klip River Bridge to Sand Spruit, and up Sand Spruit to its source in the Berg).—Members: H A Potgieter, A A Wetherell, B Nel, F Van Rooyen, H Portsmouth. No. 4 (Rest of Division South and East of Sand Spruit and West of Main Line).—Members: W Leathern, H Illing, J H Newton, E Robinson, G W Willis. No. 6 (Whole of Division East of Main Line).—Chairman: J G de Waal. Members: R A Smith, H Nicholson, P Cronje, J Farquhar.

KRANTZKOP.—Chairman: L L D Proksch, Krantzkop. Members: L M J Van Rooyen, L M J Van Rooyen, F E Van Rooyen, J H Van Rooyen, J P Zietsman, A Johnson.

IXOPO.—Chairman: Magistrate. Members: Thos Allen, Geo Martin, E Marriott, A Stone, G A Cooper, J.P., Wm Gray, D Campbell, F L Thring, J.P.

LION'S RIVER.—No. 1 (Southern portion of West of Main Line).—Chairman: U K McKenzie, Lidgettton. Members: R J Spiers, F North, A McLean, J Morphew. No. 2 (Northern portion West of Main Line).—Chairman: G Ross, Nottingham Road. Members: J Clouston, K Soutar, D Connel, D Smythe. No. 3 (Southern portion East of Main Line).—J W Dicks, "Rosebank," Howick. Members: W M Henderson, — Buchanan, Jos Raw, H J McKenzie. No. 4 (Northern portion East of Main Line).—Chairman: H Burgmann. Members: W Methley, G Hutchinson, J J Morton, B Taylor. (The whole of the members of the Sub-Divisional Boards constitute the Central Board with the Magistrate, Lion's River, as Chairman.)

IMPENDHLE.—Chairman: T Fleming, Boston. Members: J Martens, P J Lourens, T Carter, C W Brooke, J W McLean, H Boike, C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell. *Sub-Committee appointed for Northern portion of Division* (added to Lion's River Division).—Chairman: P J Lourens, Insinga, via Nottingham Road. Members: H Boek, C N Brooke, T Carter, J Martens, J W McLean. *Sub-Committee for Southern portion of Impendhle*.—Chairman: T Fleming, Boston. Members: C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell.

LOWER TUGELA.—Members: W H B Addison, A E Jackson, H E Essery, A S L Hulett, J Brown, W O Robbins.

LOWER UMZIMKULU.—Chairman: Col. J F Rethman, North Shepstone. Members: Col. J R Royston, D C Aitken, J.P., C H Mitchell, J.P., G P Beachcroft, Claude Manning, H Albers, N Harper, J S Clarke, A Borchard, T Stapleton, Col. Bru-de-Wold.

MOOI RIVER.—Chairman: W. G. Randles. Members: J. H. Wallace, H. F. Cadle, R. Garland, John Bartholomew, J. W. Johnstone, C. R. Skottowe, J. N. Beshoff, J. R. Lindsay.

MTUNZINI.—Chairman: Magistrate. Members: F Green, G M J Gielink, G Getkate, W Saville, A H Konigkramer.

NEWCASTLE.—*No 1* (to be known as Charlestown-Ingogo District from main line of Railway where it strikes the Southern line of the farm Cloutant West, thence along Western boundary of said farm, thence along S. W. boundary of Tipperary West, thence Southern boundaries of Hamstead, Dumferline and Rodeport, thence along the Northern side of the Botha's Pass main road to where it joins the O.R.C. Boundary, thence along the boundary of the Colony, thence along the Charlestown Fence to where it joins the Railway line near Mount Prospect Gate, thence along the Railway line to Cloutant West).—Chairman: J Vos, Charlestown F.O. Members: W J Adendorff, A J Johnstone, A Paine, A H Trouw, Angus Wood. *No. 2* (Newcastle district Southern boundary of No. 1 along Railway line from Cloutant West, including portion of Town Lands, Newcastle, which by agreement with Government is considered to be West of line, thence along Railway line where it strikes the Southern boundary of the farm Kopjeallen, thence along Southern boundaries of Kopjeallen, The Gardens, and Lincoln to the Ingagane River, thence up the Ingagane up to the farm Falixtows, along Southern boundaries of Falixtown, B. Iwerton, Brooklyn, Stonehenge, Tathamscamp, Hanover, Ellensdale, Endsel, Bejuisel, Stelazies Kop, Mount Blanc, to O.R.C. border fence, thence along O.R.C. boundary joining Southern boundary of No. 1 at Botha's Pass).—Chairman: S W Reynolds. Members: F A R Johnstone, W Moller, J.P., L H S Jones, C Earl, F Meyer, J J Muller, — Van Breda, J Macdonald, J C Adendorff, E Sanders. *No. 3. Dannhauser District* (Bounded by Southern District No. 2 from the Railway line at Kopjeallen to the Berg, thence along O.R.C. border, the boundary between Newcastle and Klip River Divisions, thence along the Railway line to the farm Kopjeallen).—Chairman: W L Oldacre, Dannhauser. Members: Geo Friend, B Harrington, L J Muller, J Ecksteen, E Hodson, W Watson, Ted Twyman, G Langley, Don Urquhart. *No. 4* (East of Railway Line, along the boundary between Newcastle and Dundee Divisions from the Railway Line near Dannhauser to the Buffalo River, along the Buffalo River to the junction of the Ingagane, thence along the Ingagane to its junction with the Ineander, thence along the Ineander to the fence of the Newcastle Town Lands, known as the Eastern boundary of the Railway Line, thence along the Eastern side of the Railway Line to the Magisterial Division boundary near Dannhauser).—Chairman: T K Boshoff, Dannhauser. Members: J H Potgieter, H Miller, J H van der Westerhuizen, J J Kemp, W Dicks, C Uys. *No. 5* (the strip of land lying between the Railway Line and the Buffalo River from the Ingagane and Ineander streams, which form the North-Western boundary of No. 4 district).—Chairman: E W. Noyce, Boscobello P.O.; members, Geo Matthews, T K Panzera. *Central Board.*—Chairman: S W Reynolds, Newcastle. Members: F A R Johnstone, J Vos, Sen, Angus Wood, W Oldacre, W Watson, E W Noyce, F N Panzera, T R Boshoff, J H van der Westhuizen.

NEW HANOVER.—Central Board. Chairman: E Newmarch. Members: W W Bentley, T C Wolhuter, F Reiche, H Schmidt, E Lindhorst, W L'Estrange, A F McKenzie, W Meyer. *New Hanover Sub-Committee.*—Chairman: E Newmarch. Members: Jno Moe, W W Bentley, W Ortmann, T C Wolhuter, O J Muirhead. *Dalton Sub-Committee.*—Chairman: W L'Estrange. Members: A F McKenzie, R W Smith, G Reddinger, H Rosenbrock, J H Gordon, W Meyer. *Schroeders Sub-Committee.*—Chairman: F Reiche. Members: H Schmidt, E Lindhorst, G Moe, P Rodehorst, H T Rohrs, F Gordon, A Meyer, W Fortmann.

NQUTU.—Chairman: A Barklie, Utrecht. Members: H Wilkins, R L Flindt, W A Westbrook, J W F Hall, Dr. Knight.

PAULPIETERSBURG.—Chairman: N J Els, Viljoen's Rust. Members: J B Rudolph, G J Combrink, A Schutte, A Bester, P H van Rooyen.

PIETERMARITZBURG.—Chairman: B Swete Kelly, Pietermaritzburg. Members: W S Crart, C A Fawcett, W E Goodwin, E G McAlister, E E Hodgson.

RICHMOND.—Chairman: Magistrate. Members: E E Johnson, J Mapstone, G D Alexander, C P Lewis, C Nicholson, W Comrie, John Marwick, W P Payn, A H Cockburn. *Sub-Division No. 2.*—Chairman: G D Alexander, Nel's Rust. *Sub-Division No. 5.*—Chairman: W Oldfield, Fox Hill.

REIT VLEI DISTRICT.—Chairman: D. El Muir, J.P., Elsmore, Mooi River. Members: P. Otto, J.P., R. J. Van Rooyen, E. J. Van Rooyen, J. G. Nel, A. Kohrs, J. Hooper, Otto Norton (Hon. Secretary).

SEVEN OAKS DISTRICT.—Chairman: W J S Newmarch, Harden Heights. Members: H M Balding, J.P., J Crow, J T Martens, H Mayne, S W Cadle.

UMGENI DIVISION.—Chairman: E. S. Goodwill. Members: F. Schroeen, B. Crompton, C. Arnold, R. J. Potts, A. J. Tyler, F. J. Smith, A. Wood, J. P. Symonds, J. J. Potterill, W. H. Keytel, C. Lund.

UMLAZI.—Chairman: C Henwood, Durban. Members: W Pearcer, W Gillett, H Freese, L Jackson, P W Mackenzie.

UMSINGA.—No. 1 District (All farms lying West of the Umsinga-Helpmakaar main road).—Chairman: E C Nuss. Members: W W Strydon, J.P., J H Nuss. No. 2 District—(All farmers East of the Umsinga-Helpmakaar main road—excepting the farms Sutherland, Gordon, Memorial Mission and Pomeroy Town Lands, and Location lying North of the Mazabeko and West of the Buffalo River.—Chairman: W H Wholberg, P.O. Elandskraal. Members: H W Dedekind, J Dedekind. No. 3 District—(The remaining portion of the area lying in the Umsinga Division).—Chairman: A Muller. Members: M J Matheson, H Muller. The three Committees to constitute the joint Committee.

VRYHEID.—Chairman: A von Levetzow, Vryheid. Members: P Labuschagne, B E A Rabe, G M van der Westhuizen, J Kruger, J F Potgieter, L M N Nel.

WEENEN.—Chairman: C G Jackson, Weenen. Members: C Harding, J.P., P J van Rooyen, J.P., K Rotteher, S B Buys, J J Vermaak, L C Kinsman, J W A Pole, C F Vermaak, P R Buys, J C's son.

Executives of Farmers' Associations.

ALEXANDRA AGRICULTURAL AND HORTICULTURAL ASSOCIATION.—President: Wm Thompson. Hon Vice-Presidents: A Blamey, E W Hawksworth, Thos Kirkman, H Basley, J L Knight, R.M. Hon Secretary and Treasurer: Geo Lamb. Hon. Auditor: W B Brunner. Committee: W Arnott, H G Arbuthnot, R C Archibald, R G Archibald, J Bazley, A Behrmann, W Cooke, G J Crookes, R Cruickshank, H D Hawksworth, H E Hawksworth, A F W Hawksworth, R C Hawksworth, J Landers, D McAndrew, F Nelson, C A Preston, Dr. Rouillard, W A Gilbert, Fred Blamey, Rev B M Ford, S C Hawksworth, J C Landers, S F Crookes, J J Crookes, R A Lindsay, J A Curle, F B Preston, R Parkin, H Reynolds, J B Stewart, C Taylor, H H P Waller, J Ross, Rev W C Wilcox, Dr W P Tritton.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A G Prentice, J.P. Vice-Presidents: C Knox, J.P., L T Trenor, and C A Holwell. Hon. Secretary and Treasurer: H C Hitchins. Committee: C M Etheridge, R Fann, J.P., V Hitchins, S Aitchison, J.P., W B Rethman, Dr Case, J.P., H Rethman, R G Mack, J Hogg.

BOSTON FARMERS' ASSOCIATION.—President: Thos. Fleming, J.P. Vice-President: T. W. Rudland. Hon. Secretary: W. J. Fly, J.P. Hon. Treasurer: H. A. Phipson.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J Gavin and John W Harvey, J.P. Hon Secretary: W E Allsopp.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon, J.P. Vice-President: F N Meyer. Hon Secretary: J Baker. Committee: H Baker, J Gavin, J W Harvey, J.P., W B Turner, H H Hutton, C Baker, H E Meyer.

CHARLESTOWN FARMERS' ASSOCIATION.—President: Johannes Vos. Vice-President: — Adendorff. Secretary: W. J. Curnow. Treasurer: J. O. Thomas. Committee: H. O. Eksteen, J. P. Vos, J. C. Uys, W. G. Thomas, D.

Doyer, F. A. R. Johnstone, M.L.A., G. E. Lane, S. R. Higgins, B. F. Johnstone, A. J. Johnstone, J. J. Eksteen, R. H. Greavss, Peter Thompson, G. McArthur, and V. B. van Rooyen.

DRONK VLEI FARMERS' ASSOCIATION.—President: Capt Perceval. Vice-President: Alban Hodson. Hon Secretary and Treasurer: Edward Marriott.

DUNDEE AGRICULTURAL SOCIETY.—President: T. P. Smith. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, F. Thurton, and W. Craig. Hon. Secretary and Treasurer: J. McKenzie. Committee: A. W. Smallie, W. J. H. Muller, G. M. de Waal, B. J. Humann, R. Retallack, H. Ryley, H. J. Head, C. T. Vermaak, H. P. Walker, J. Dyson, H. Wiltshire, J. Campbell, H. Greenhough, D. W. H. Tandy.

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ZULULAND COAST FARMERS' ASSOCIATION.—President: G H Hulett. Vice-President: C Hill. Hon Secretary and Treasurer: F Erammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the fund, Post Office Buildings, Pietermaritzburg.

All correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Experiment Station Notices.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Chief Afforestation Officer, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes. Offers should be made in the first instance to the Chief Afforestation Officer, Cedara.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application to the Chief Afforestation Officer, Cedara.

CENTRAL EXPERIMENT FARM, CEDARA.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

As the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

In view of the fact that Parliament has refused to grant the necessary funds, the cost of railway tickets can no longer be borne by the Department of Agriculture.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

24th September, 1907.

W. A. DEANE, Minister of Agriculture.

FEEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experiment Farm, Cedara, in accordance with the following scale of fees, which is subject to revision:—

	Scale I.	Scale II.
	£ s. d.	£ s. d.
FERTILIZERS AND FEEDING STUFFS:		
Determination of 1 constituent	0 7 6	0 5 0
Determination of 2 or 3 constituents	0 15 0	0 10 0
Complete analysis	1 1 0	0 15 0
SOILS: Partial analysis of a soil in relation to its fertility	1 1 0	0 10 6
Complete analysis of a soil	2 2 0	1 1 0
WATER: Irrigation and drainage	1 10 0	0 10 6
VEGETABLE PRODUCE: Fodders, Ensilage, Grain, etc.	1 1 0	0 15 0
MILK, CREAM, BUTTER: Fat only	0 5 0	0 2 6
" : Complete	0 15 0	0 7 6
WATTLE BARKS AND TEA: Tannin	0 5 0	0 2 6
CATTLE DIPs: Quantitative analysis of 1 to 3 principal constituents	0 10 0	0 5 0
INSECTICIDES:		
Qualitative analysis each constituent	0 5 0	0 2 6
Quantitative " " "	0 10 3	0 5 0

Scale No. 1 is applicable to samples handed in by Merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Department, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Department to remit any charges hereunder.

E. R. SAWER,
Director, Experiment Stations,
Acting Conservator of Forests.

November 22nd, 1907.

TENDERS FOR MONO-RAIL SYSTEM.

Tenders are invited for the purchase of 6,400 feet of mono-rails, with points, etc., and four sugar cane trucks, from the Central Experiment Farm.

Tenders should be addressed to the Director of Experiment Stations, Cedara, and should be submitted with the least possible delay.

MAIZE SEED.

Growers who may have for sale selected seed of the following types of maize are invited to communicate as early as possible with the Director of Experiment Stations, Cedara:—Horse Tooth, Hickory King, Boone County, Golden King and Yellow Dent.

Publications Issued by the Department of Agriculture.

THE following publications, issued by the Department of Agriculture, are still in print, and copies may be obtained free (except those with price attached) upon application to the office of the *Agricultural Journal*, Department of Agriculture, Pietermaritzburg. The figures in square brackets (e.g. [1904]) are the years in which the various publications were issued.

No.

BULLETINS.

- 2.—“Manures on the Natal Market, 1902,” by Alex. Pardy, F.C.S., Analyst. [1902.]
- 2a.—“Treatment of Milk and Cream, from the Producer to the Consumer,” by E. O. Challis, Dairy Expert. [1904.]
- 4.—“Manures on the Natal Market, 1903,” by Alex. Pardy, F.C.S., Analyst. [1903.]
- 6.—“Manures on the Natal Market, 1904,” by Alex. Pardy, F.C.S., Analyst. [1904.]
- 7.—“Tree-planting in Natal,” by T. R. Sim, F.L.S., Conservator of Forests. [1905.]
(Price 2s. 6d., post free.)
- 8.—“Agricultural Co-operation,” by E. T. Mullens, Secretary, Minister of Agriculture. [1905.]
- 10.—“Manures on the Natal Market, 1905,” by Alex. Pardy, F.C.S., Analyst. [1905.]
- 11.—“East Coast Fever,” by S. B. Woollatt, Principal Veterinary Surgeon. [1906.]
- 12.—“Manures on the Natal Market, 1906,” by Alex. Pardy, F.C.S., Analyst. [1906.]
- 13.—“Report on the Disease known as ‘Bluetongue’ in Sheep,” by H. Watkins-Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1908]
- 14.—“Poultry-Keeping in a Simplified Edition for Farmers,” by F.C. [1908.]

REPORTS.

- Annual Report of the Agricultural Department, 1902. (Includes Reports of the Director of Agriculture, Entomologist, Conservator of Forests, Dairy Expert, Editor *Agricultural Journal*, etc.) [1903.]
- Report of the Secretary, Minister of Agriculture: January 1, 1903, to June 30, 1904. [1905.]
- Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1905. [1905.]
- Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1906. [1906.]
- (For a continuation of the statistics given in these reports see reprint “Natal’s Progress in 1906,” noted below.)
- Fourth Report of the Government Entomologist: 1903-4. [1905.]
- Fifth Report of the Government Entomologist: 1904-5. [1906.]
- Sixth Report of the Government Entomologist: 1905-6. [1907.]
- (The Third Report of the Entomologist is included in the “Report of the Agricultural Department, 1902,” noted above.)
- Report of the Conservator of Forests, 1902. [1903.]
- Interim Report of the Conservator of Forests up to December 31, 1905.
- Report of the Principal Veterinary Surgeon, for year ended 30th June, 1906. [1907.]
- First Annual Report of the Land Board, 1905. [1906.]
- Annual Report of the Land Board, 1906-7.

MISCELLANEOUS REPRINTS, ETC.

- Black Spot ("Letter Book Pages": reprinted from *Journal*.)
- Mealie Grubs (do do)
- Mosquitoes (do do)
- Woolly Aphis (do do)
- Cotton. By A. N. Pearson, Director, A. E. & C. (Reprinted from *Journal*: 1904.)
- Co-operation. By E. T. Mullens, Secretary, Minister of Agriculture. (Reprinted from *Journal*: 1907.)
- Citrus Fruit Export. (Reprinted from *Journal*: 1907.)
- Natal's Progress in 1906. (Reprinted from *Journal*: 1907.) The statistics contained in this paper are on the same lines as those in the Annual Reports for previous years of the Secretary, Minister of Agriculture.
- Natal's Progress in 1907. By H. J. Choles, F.S.S. (Reprinted from *Journal*: 1908).
- Fibre Cultivation. (Reprinted from *Journal*: 1907.) This paper is a summary of Bulletin No. 13 of the Department of the Interior, Bureau of Agriculture, Manila.
- Sisal, Mauritius Hemp and other "Aloe" Fibres. By T. R. Sim, F.L.S., Conservator of Forests. (Reprinted from *Journal*: 1907.)
- The Fibre Industry of Mauritius. By Leonard Acutt, J.P., Tongaat; Member of the Land Board, Natal. (Reprinted from *Journal*: 1907.)
- South African Products Exhibition, 1907. Report of T. R. Sim on the Natal Exhibits. (Reprinted from *Journal*: 1907.)
- Poplar Timber for the Local Manufacture of Matches. By E. R. Sawyer, Director, E.S. (Reprinted from *Journal*: 1908.)
- Agricultural Industries and Land Settlement in Natal. [1907.]
- Judging Fruit, Flowers, Plants and Vegetables at Shows. By T. R. Sim, F.L.S., Conservator of Forests. [1906.]
- Agricultural Statistics, Natal, 1905-6. [1907.]
- Model Rules for Agricultural Co-operative Societies. (*Price 1s., post free.*)

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HAY-RAKING.

The Natal Agricultural Journal.

Natal's Trade in 1908.

THE monthly returns of the S.A. Customs Statistical Bureau for December came to hand too late to be considered in the January issue of the *Journal*. The December returns are always of especial importance, since they give us the first opportunity of studying the trade of the twelve months which they bring to a close; and with those we have recently received before us we propose to bring to our readers' attention the main points noticeable in the trade of 1908.

The year 1908 was characterised by smaller imports, indicating lessened spending powers, and this is the chief feature of the trade returns of the year. The decreases in the imports are evident, not only in the category of articles of food and drink, but in all classes. (Readers may remember, from the article in respect of the trade of 1907 which we published in our February issue of 1908, that the Customs Bureau divides imports into five general classes: I., Living Animals; II., Articles of Food and Drink; III., Raw Materials and Articles, mainly Unmanufactured; IV., Manufactured Articles; and V., Articles Imported Oversea through the Post. The important classes are II., III. and IV., Class I. comprising only a very small percentage of the grand total.) These decreases are shown in the following statement:—

Value of Merchandise Imported (Oversea) in 1907 and 1908.

	1908.	1907.
	£	£
I. Living Animals	27,519	34,980
II. Articles of Food and Drink	1,813,095	2,221,516
III. Raw Materials, etc.	518,349	583,725
IV. Manufactured Articles	4,081,495	4,180,347

These figures, it will be noted, refer to imports from countries overseas, and a shrinkage is observable in every class. On the other hand, our imports of South African produce increased—amounting to £983,206 in value in 1908 and to £939,193 in 1907. The grand total of imports (including gold and specie, and merchandise for Natal and other South African Governments) was £9,325,225 in 1908, as compared with £10,262,042 in 1907.

To readers of the *Journal* the second of the Bureau's categories—"Articles of Food and Drink"—is naturally of greatest interest; and we may accordingly now proceed to examine individually some of the most striking changes which are noticeable under this head. We give a full table of the imports of articles of food and drink, comparing the figures for 1908 with those for 1907; and from this table it will be seen that Natal imported less of most of the commodities shown. The exceptions are cheese, raw coffee, wheat, tea, potatoes and fresh vegetables not otherwise described. These increases—with the exception of wheat, which we shall refer to directly—are unfortunate, to say the least of them, but in the case of potatoes and other vegetables we cannot forbear to go further, and to say that it is simply a disgrace to ourselves as farmers that we should be importing such quantities of these commodities, especially potatoes. Of these latter we imported 2,748,550 lbs. in 1908, as compared with 1,872,132 lbs. in 1907, an increase of over 46 per cent.! In the case of other vegetables, we imported 806,383 lbs. in 1908, as compared with 722,671 lbs. in 1907. As regards the imports of wheat, the increases are a matter for congratulation than otherwise. It will be many years before South Africa will be in a position to fulfil all her wheat requirements, and in the meantime we are compelled to import our bread-stuffs. The increase in the imports of wheat should be read in connection with the decrease in the imports of wheaten flour, for in these figures we have an indication of the progress which local milling is making. We are thus building up a large local industry, which supplies us with our flour from imported grain instead of importing flour that has been ground overseas. The changes in the figures are so striking that we set them out here to draw particular attention to them:—

Imports of Wheat and Flour, 1908 and 1907.

	1908. lbs.	1907. lbs.	
Wheat	12 718 739	5 518 917	—An increase of 130 per cent
Wheaten Flour	47 014 303	60 106 173	—A decrease of 22 per cent.

It will be noticed in the table we give that there are noteworthy decreases in the imports of bacon and hams, butter, eggs, lard, meat and condensed milk; and we would also draw attention to the gratifying decrease in the imports of sugar of all kinds (1908: 7,551,067 lbs.; 1907: 12,729,535 lbs.).

IMPORTS OF ARTICLES OF FOOD AND DRINK.

Statement showing the Quantities and Value of the Articles of Food and Drink Imported into Natal during the year 1908, as compared with the previous year.

Articles.		1908.		1907.	
		Quantity.	Value.	Quantity	Value.
Ale and Beer	galls.	65 557	£ 12 986	100 670	£ 18,669
Bacon and Hams	lbs.	2,312,250	74,570	2,452,256	87,623
Biscuits and Cakes	lbs.	757,112	17,954	843,738	22,907
Butter, &c :					
Butter	lbs.	4,019,538	210,805	4,428,148	210,547
Margarine and other Substitutes	lbs.	982,893	30,043	1,018,107	33,539
Cheese	lbs.	1,593,317	43,126	1,545,936	43,510
Chicory	lbs.	392,147	3,156	563,818	4,689
Coffee :					
Raw	lbs.	2,858,784	46,758	2,496,179	43,900
Roasted and Ground	lbs.	24,726	810	37,034	1,249
Confectionery of all kinds (N.O.D.)	lbs.	1,059,311	45,661	1,238,133	50,400
Corn, Grain and Flour :					
Maize	lbs.	1,405	9	1,974	19
Wheat	lbs.	12,718,739	49,387	5,518,917	17,938
Wheaten Flour	lbs.	47,014,303	218,205	60,196,173	227,065
Other kinds	lbs.	9,935,365	53,079	11,363,464	50,895
Eggs	No.	1,425,026	5,820	1,791,750	7,870
Fish : Fresh	lbs.	4,433	184	7,939	298
Dried and Preserved	lbs.	2,794,900	57,660	3,061,613	59,632
Fruits : Fresh, including Nuts	...	...	20,261	...	37,987
Dried and Preserved (except Dates)	lbs.	1,072,686	17,281	1,467,683	26,047
Jams and Jellies	lbs.	760,911	12,538	959,402	16,122
Lard	lbs.	483,261	10,628	740,963	17,388
Meats : Fresh or Frozen	lbs.	17,688,309	181,190	40,655,363	459,491
Tinned or otherwise preserved	lbs.	579,452	19,547	721,404	23,761
Milk, Condensed	lbs.	4,239,744	72,197	4,854,048	86,425
Oatmeal and other Farinaceous Foods	lbs.	2,267,183	26,380	3,082,342	34,409
Rice	lbs.	38,426,703	186,319	42,094,442	195,004
Spirits potable	galls.	343,192	137,290	394,335	157,034
Sugar of all kinds	lbs.	7,551,067	44,371	12,729,535	68,210
Sugar Products	lbs.	1,756,673	14,279	1,811,620	14,600
Tea	lbs.	1,589,690	70,895	1,339,493	60,959
Vegetables : Potatoes	lbs.	2,748,550	8,182	1,873,132	5,693
Fresh (N.O.D.)	lbs.	806,383	3,168	722,671	2,443
Bottled or Tinned	lbs.	472,495	6,604	711,579	9,043
Wines of all sorts	galls.	26,466	20,081	31,224	21,381
Other Articles of Food and Drink (N.O.D.)	...	...	92,271	...	104,449
Total	...	...	1,813,095	...	2,221,546

There is nothing further worthy of note in the import figures, with the exception of one item which we shall refer to directly. As already stated, in all the categories there are decreases, indicative of shortened spending powers, but whether this scarcity of money is as much in evidence in Natal as in the Transvaal we cannot say until the appearance of the Customs Bureau's Quarterly and Annual Blue-Books, since the returns before us do not show the extent of exports for the whole year

from Natal to other parts of South Africa. The one special item to which we referred above is that of fodder and forage. Last year we drew attention to the fact that our imports of this commodity had sunk from £29,184 in value in 1906 to £17,585 in 1907. We notice from the returns before us that there is a further decrease, and this time a very large one: from £17,585 in 1907 to £4,184 in 1908. This is most gratifying, since it has for long been a standing disgrace to us that we should be importing any quantity of forage or fodder at all.

We may now proceed to examine the figures relating to exports of South African produce. Here we again see increases, although not so large as we should have liked. South African produce (excluding raw gold and gold concentrates) to the value of £1,942,567 was exported overseas through Durban last year, as compared with £1,762,684 in 1907 and £1,181,808 in 1906. Our exports of South African produce to other States in the S.A. Customs Union amounted to £1,868,537 in 1908, as against £1,538,126 in 1907 and £1,497,166 in 1906. The significance of these figures—with their totals—is shown in the following statement:—

Exports of South African Produce from Natal.

		1906. £	1907. £	1908. £
Oversea	...	1,181,808	1,762,684	1,942,567
S.A.	...	1,497,166	1,538,126	1,868,537
Totals	...	<u>2,678,974</u>	<u>3,300,810</u>	<u>3,811,104</u>

Decreases in overseas exports are noted in the following commodities, viz.: Horses, maize, fruit, raw gold and concentrates (produce of the Transvaal), goat skins and tea. One or two of these are important. We have seen that the imports of tea during 1908 were much larger than those for 1907; and here we find that the exports overseas were to the extent of 276,558 lbs. only last year, as compared with 584,299 lbs. in 1907. These figures would appear to indicate that there is something wrong with the tea industry; but we shall offer no further comment until the appearance of the Bureau's Annual Blue-Book gives us an opportunity of examining the exports to other parts of the S.A. Customs Union. The export of mealies in 1908 fell short of those in 1907 by about 63,000 muids.

The most noteworthy increases in our overseas exports of South African produce are in cargo coal (1907: 56,850 short tons; 1908: 201,098 short tons); corn, grain and meal—other than maize (1907: 355,843 lbs.; 1908: 2,540,215 lbs.); fodder and forage (1907: 1,817,239 lbs.; 1908: 5,323,642 lbs.—this is especially gratifying); whale oil; common soap (1907: 1,597 lbs.; 1908: 369,719 lbs.); spirits; sugar (1907: 31,239 lbs.; 1908: 588,251 lbs.); and wool in the grease (1907: 19,733,887 lbs.; 1908: 22,574,002 lbs.). In the accompanying table we give the quantities and

values of South African produce exported during 1908 with the figures for 1907 for comparison.

EXPORT OF SOUTH AFRICAN PRODUCE OVERSEA.

Statement showing the Quantities and Values of South African Products Exported Oversea from Natal during the year 1908, as compared with the previous year.

Articles.				1908.		1907	
				Quantity	Value	Quantity	Value.
					£		£
Animals, living	Horses	..	No.	26	535	29	783
Do.	do.	All other	..	..	811	..	604
Bark	...	...	lbs.	55,075	787	133,509	136,873
Coal, Bunker	...	Tons of 2,000	lbs.	709	976	669,970	528,093
Do. Cargo	...	do.	do	201,098	142,263	56,850	38,242
Corn Grain and Meal—Maize	...	...	lbs.	73,121,926	163,500	85,732,742	171,169
Do.	do.	All other	lbs.	2,540,215	5,747	355,843	760
Fodder and Forage	...	...	lbs.	5,323,642	10,004	1,817,239	4,271
Fruit, fresh and dried	...	...	...	...	2,117	...	3,025
Hair Angora	...	...	lbs.	1,319,636	47,375	1,125,957	51,090
Hides and Skins :							
Hides, Ox and Cow	...	...	lbs.	5,533,625	116,673	4,278,345	106,123
Skins, Goat	...	...	lbs.	111,198	1,364	151,192	2,876
Do. Sheep	...	...	lbs.	1,582,803	27,821	1,413,631	34,341
Matches	...	...	gross	4,951	795	4,338	611
Oil, Whale	...	...	galls.	110,369	8,853	...	...
Soap, Common	...	...	lbs.	369,719	3,508	131,465	1,597
Spirits of all sorts	...	...	galls.	221,994	9,602	112,564	3,846
Sugar	...	...	lbs.	588,251	2,438	31,239	253
Tea	...	...	lbs.	276,558	9,394	584,299	20,147
Tobacco	...	...	lbs.	9,802	525	6,192	1,203
Wool, Sheep's (scoured and washed)	...	...	lbs.	543,138	32,828	530,211	33,651
Do.	do.	(in the grease)	lbs.	23,574,042	626,652	19,733,887	603,604
Other Articles of S.A. Produce	...	...	...	...	23,846	...	19,522
Total	...	...	...	...	1,942,567	...	1,762,684
Gold, Raw†	...	...	ozs.	265,416	994,566	322,533	1,200,596
Do Concentrates†	...	...	...	..	17,841	...	33,021
GRAND TOTAL (OVERSEA)*	...	...	...	...	2,954,974	...	2,996,301

* It will be noticed that the decrease in the Grand Total of Exports is due to the smaller quantities of Gold exported.

† Produce of the Transvaal.

From the comparative table of shipping we notice that the total tonnage of cargo landed during 1908 was 436,651 tons, as compared with 479,482 tons in 1907 and 563,791 tons in 1906; while last year 608,073 tons of cargo were shipped, as against 472,159 tons in 1907 and 298,233 tons in 1906—healthy signs indeed, from the farmer's point of view, showing that we are exporting more and importing less. We do not, of course, believe in diminishing imports over an indefinite period,

but at the present stage of the Colony's progress our object is to export as much as we can and as far as we are able become self-supporting. Then as our wealth increases so may our imports of goods, which at the present time are regarded as luxuries, increase. What these figures tell of the diversion of shipping to Delagoa Bay, however, is another tale, which does not concern us here. Certainly the decreases in the quantities of cargo shipped, which are noticeable in the figures we have quoted above, are due to a considerable extent to the diversion of trade to the Portuguese port, and thus represent revenual loss to this Colony; but this *Journal* is concerned more with the realisation of latent wealth—which is the end of farming—and from our view point, therefore, the returns which we have been examining contain matter for congratulation rather than otherwise, indicating as they do further progress on the part of most of the producing industries of the Colony.

The Maize Crop in January.

IN our last issue, in reporting upon the state of the maize crop of the Colony and the prospects on the 31st December, we showed that the condition of the crop on that date was 2·7, or between "fair" and "average," and calculated therefrom that the prospects were for a crop giving an average of 4·7 muids to the acre for the whole Colony. We are glad to be able to announce in this issue that the prospects of the crop have improved considerably, and that the condition of the mealie crop on the 31st January was 3·1, or very slightly above the average of the preceding five years. This gives a yield of 5·34 muids to the acre; and multiplying the acreage which we estimated last month—166,000 acres—we get a probable crop of about 886,000 muids, or 106,000 muids more than we estimated last month.

As we stated last month, we use the figures 1, 2, 3 and 4 to represent the condition "Poor," "Fair," "Average" and "Above the Average" as reported by our correspondents; and bearing the significance of these figures in mind the following results will doubtless prove of interest to the reader. We may first, however, again explain our method a little more clearly, taking the condition represented by the figures 2·7 as an example. The figure "2," it will be remembered, represents the condition described as "Fair," whilst "3" represents "Average" condition. Thus 2·7 will represent an *average* condition of from "Fair" to "Average,"

but a little nearer "Average" than "Fair." This does not mean, of course, that all the crops in that Division may be described as 2·7 in condition. In fact, it may easily be that not a single field is of such condition. The meaning is that, taking the crops as a *whole*, their condition is something a little more than midway between "fair" and "average."

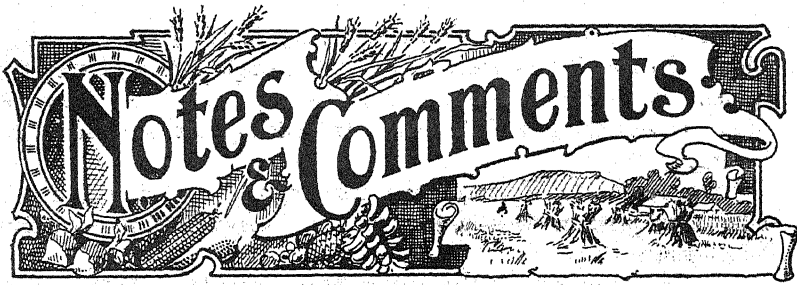
Our results for January, given for Magisterial Divisions, are as follows (we print in brackets, for purposes of comparison, the conditions for December):—

Lower Umzinkulu, 3 (December, 2·7); Alexandra, 4 (2·5); Umlazi, 3 (?); Inanda and Indwedwe, 4 (3); Lower Tugela and Mapumulo, 4 (2); Impendhle, 3 (3); Alfred, 4 (3); Ixopo, 4·25 (2·4); Richmond, 3 (2·5); Umgeni, 3·5 (3); New Hanover, 2·75 (2); Lion's River, 3 (3); Umvoti, 3·2 (3·7); Krantzkop, 2 (3); Underberg, 3 (4); Polela, 4 (3); Bergville, 2·7 (3); Estcourt, 2·9 (2·7); Weenen, 2 (3); Klip River, 2·6 (2·8); Umsinga, 2·5 (2); Dundee, 1·7 (2); Newcastle, 2·9 (3); Vryheid and Ngotshe, 2 (2·5); Utrecht, 4; Eshowe and Mtunzini, 2·5 (3); Emtonjaneni, 3·4 (2).

Mr. G. C. Mackenzie, of Buccleuch, has been appointed a member of the Natal Land Board until the 30th June, 1910.

The General Manager of Railways notifies us that, on and after the 1st March, 1909, the regulations affecting the bags used for the conveyance of mealies will be strictly adhered to *viz.*, bags must be new and doubly sewn; and of not less than 2½ lbs. in weight. Bags not coming up to this standard will subject the exporter to the loss of the special rate allowed on this traffic.

The General Manager of Railways announces that the extension of the Natal-Cape Railway from Creighton to Riverside (Cape Colony) will be opened for all classes of traffic, except live stock, on Thursday, February 4th, 1909. The Cape Government regulations prohibit the acceptance of live stock at Riverside Station. All traffic will be handled at Riverside free of charge, excepting traffic otherwise specially provided for in Goods Tariff Book No. 22. The General Manager has also notified that, with effect from the 15th February, the rates on goods traffic to and from Riverside Station will be reduced. Full details of the revised rates may be obtained on application to Station Masters.



Agricultural Shows, 1909.

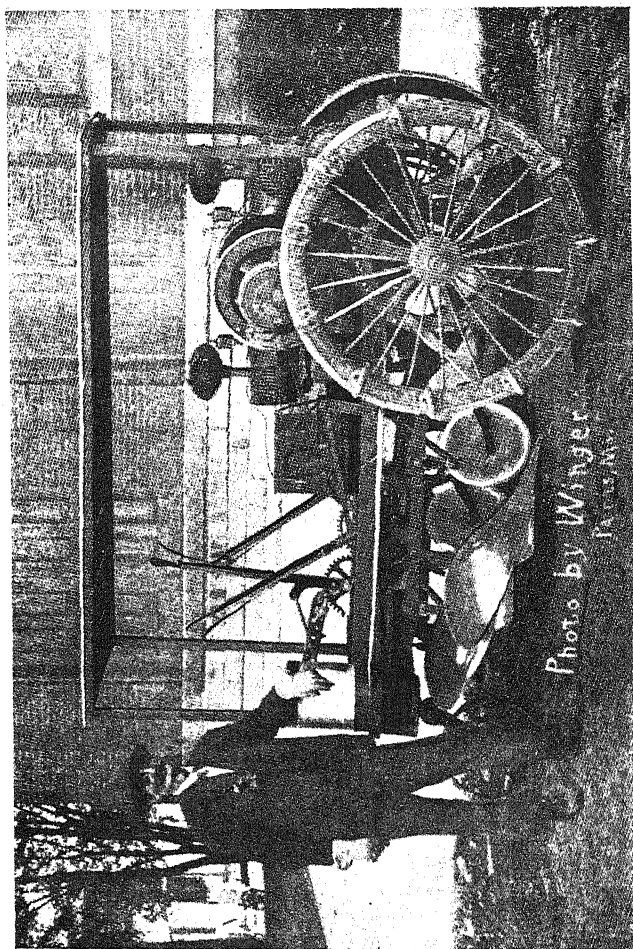
At the end of the present issue we publish, in accordance with our usual custom, a list of the shows which have so far been fixed to be held this season in Natal, Cape Colony, Orange River Colony, and Transvaal. Our information at this early stage is necessarily brief, but we shall be able to make our list more complete in future issues of the *Journal* as further information comes to hand. We take this opportunity of thanking the secretaries of those societies who have been good enough to forward us information; and we shall be glad to hear from the secretaries of the remaining societies as soon as the dates of their respective shows have been fixed.

"Farm and Garden Notes."

Many of our readers—especially those (and there are many of them) who are just starting farming—will welcome the new feature which we are enabled, through the kindness of Mr. Geo. Carter (of Messrs. Carter & Co., the well-known seedsmen, etc., of Maritzburg), to introduce with the present issue, *viz.*, a series of monthly "Farm and Garden Notes." A glance at the notes in the present issue will give some idea of their scope, and they will be seen to contain useful information for the farmer and gardener.

Agriculture in Hungary.

On January 11th and 12th, Prof. London M. Douglas delivered two lectures on the subject of Hungarian Agriculture at the University of Edinburgh, as a result of a recent visit which he had paid to Hungary. He wished to express, first of all, his indebtedness to His Excellency, Dr. Daranyi, the Minister of Agriculture, for much assistance with the preparation of the lectures and also for the illustrations, which consisted of a large number of lantern slides prepared from photographs, and also a collection of agricultural products of an interesting kind. The lecturer described the features of Hungary and its exact position in connection with the other



AUTOMOBILISM AND FARMING.—I.

A Gasoline Tractor built by H. W. Leavitt, Paris, Missouri.

countries in Europe, and also pointed out that it was subject to great fluctuations in temperature, these being very high in summer and very low in winter: both extremes in their own way, suspending—to a large extent—agricultural operations.

Budapest is the capital of the country, and is a magnificent modern city. Amongst its splendid institutions and colleges it possesses the Royal Hungarian Agricultural Museum, which is said to be the largest institute of its kind in the world. The large estates in Hungary form a feature in the country, and these are owned partly by private individuals and also by the State. Of recent years, however, they have been to some extent broken up into small holdings which now occupied some 15 million acres of territory. The principal industry carried on under the Board of Agriculture was that of animal breeding, and involved the specialization of the breeding of horses, horned cattle, sheep, pigs and poultry, but the greatest of all these was the industry of horse-breeding, which is carried on at the State farms at Mezohegyes, Kisber and Babolna. The lecturer was able to give a large number of illustrations of the various English thoroughbreds, Arabs and other horses which are used to improve the native stock, and went on to point out that this horse-breeding industry was very important to Hungary, inasmuch as the annual export amounted to 1½ million pounds sterling.

The principal crops grown in Hungary were wheat, rye and maize, but there were many others which were also cultivated, such as tobacco, which was a State monopoly, and which was being largely fostered and developed. Dairying was affected, not only by the breeding of cattle, but the breeding of milk-giving sheep, the milk of which was used in the manufacture of butter and cheese. Buffalos were kept, as were the Hungarian native cattle, very largely for the purposes of draft oxen, and, while they were slow in movement, their use was considered economical on the farm. Wine-growing was an industry by itself, and it has attained to great dimensions in Hungary. Hungarian wine was not very well known in Western Europe, but it was very largely consumed in the country itself. The whole industry, however, was so great that it would not be possible to deal with it, except as a special subject by itself.

The control of the rivers and the reclamation of the land were also interesting subjects, and it had paid the State to build retaining banks along the principal rivers, so as to save the farms adjoining them from floods. On the whole, it might be said that the progress which had taken place in Hungary during the last 25 years had placed it in the highest rank amongst civilised nations.

International Conference of Sheep-Breeders.

The Department of Agriculture has been notified by the Secretary of the National Sheep-Breeders' Association (Mr. W. W. Chapman, 4, Mowbray House, Norfolk Street, Strand, London, W.C.) that the Tenth International Conference of Sheep-Breeders will be held on Monday, 21st June, 1909, in the Guildhall, Gloucester, at 4 p.m., by kind permission of His Worship the Mayor and Corporation of the City of Gloucester, the day before the opening of the Royal Agricultural Show at Gloucester. The subject for discussion—"How can we Improve the Sheep Industry?"—is one of world-wide interest; and Mr. George McKerrow, Pewaukee, Wisconsin, U.S.A., has consented to open the discussion by reading a paper on the subject.

The Secretary of the National Sheep-Breeders' Association notifies that his Council would be pleased to welcome representatives from any societies interested in sheep-breeding; and he also states that his Association has powers under its Memorandum and Articles of Association to admit into affiliation foreign and Colonial Sheep Societies, an opportunity which has already been taken advantage of by several societies. The terms of subscription for such societies are £1 1s. a year for each member of the Council nominated by the society affiliated, with a maximum of four representatives from any society—this being the limit of representation allowed any affiliated society. Copies of the rules, etc., can be obtained on application from the Secretary.

Import of Silkworm Cocoons into Argentine.

The following translation of a decree enacted by the President of the Argentine Republic, dated 5th November, 1908, relative to the introduction of cocoons of silkworms into the Republic, is published at the request of the Consul for the Republic, Durban:—"Whereas it has become convenient, as reported by the Commission appointed to study the condition of the sericulture (silk husbandry) industry of the Argentine Republic and to advise as to the best measures to follow for its implantation and growth, to forbid the introduction of cocoons of silkworms attacked with disease that may become a danger to the aforesaid industry: The President of the Argentine Republic decrees: Art. 1.—Whereas it is forbidden to import cocoons of silkworms that may be infected with disease, allowing only those which bear certificates of soundness, issued by competent authorities and legalised by the Argentine Consul nearest the place of origin. Art. 2.—The present decree will come into force as from the first day of February, 1909, to which effect regulations will be issued by the Department of Agriculture. Art. 3.—Communicated, given, and published in the National Register. (Signed) FIGUEROA. ALCORTA; (Signed) PEDRO EZCURRA"

Chicory.

Mr. T. W. Turner, of 117, Prince Edward Street, Durban, has favoured us with a copy of a circular which he had addressed to chicory growers in various parts of the Colony. The present has been a somewhat extraordinary season for chicory, and Mr. Turner, who is a large purchaser of the dried root and who has had a considerable amount of experience with the plant, offers some useful and timely hints to growers. "Under ordinary conditions," he remarks, "chicory does not run to flower the first year. The present season has, however, been of such an extraordinary character, that there is a tendency on many farms for a portion of the crop to prematurely run to flower. The roots of chicory that have thrown up a flower stalk are useless for drying, and should be fed to the stock at once. Plants which show a tendency to shoot up should be pulled at once to save them, cut in slices about $\frac{1}{2}$ inch, and dried. These, though not first quality, would be purchased by me if guaranteed free of the roots that have long stalks."

***Paspalum* on the Coast.**

A correspondent at Isipofu, *via* Umtwalumi, has supplied the Director of the Division of Agriculture and Forestry with some interesting information embodying the results of trials made by him with *Paspalum dilatatum*. He writes as follows:—"After raising the plants in a seed bed, I planted out some on untilled land, and some on cultivated land. The former I found did not thrive, the native grasses crowding it out entirely, in fact I cannot now find it. That I planted on worked land has done splendidly. It was planted after mealies, after second hoeing, rows 3 feet apart and plants 2 feet apart in the row. It has now covered the ground entirely and is killing out all weeds. The growth is vigorous, and it is green all the year round, even when all other grasses seem dry and brown."

"I have long since come to the conclusion," Mr. Sawyer's correspondent continues, "that *Paspalum* is likely to prove a nuisance on the coast. When animals are used for tillage, and feed on *Paspalum*, they drop the seeds in cultivated land, and when it gets a hold I find it hard to destroy—in fact, nothing short of uprooting, piling, and burning seems to keep it under. Some 2 $\frac{1}{2}$ years ago I planted some land with sugar cane. *Paspalum* made its appearance during the cultivation of the cane; I had the grass uprooted and laid with the roots exposed. When cutting the cane I found that in spite of a perfect canopy having existed for two years, the *Paspalum* was still growing luxuriantly. I have also traced *Paspalum* some miles along the road, between my place and the railway station."

Automobilism and Farming.

In this issue we reproduce two illustrations, for which we are indebted to the *Gas Review*, published at Madison, Wisconsin, U.S.A., showing further developments in the application of automobilism to modern farming. We have had similar illustrations in past issues, and we think the subject is one of interest to farmers in this country, especially on account of the difficulties of transport consequent upon East Coast Fever restrictions. We do not say that mechanical tractors can take the place of oxen for long journeys and over some of our hills, but for short distances where the road is not too heavy it is probable that such tractors would prove of value on many farms. In addition to use for traction purposes, machines can be obtained for stationary use as well, as occasion may require—such as for driving chaff-cutters, threshing machines, mealie shellers, mealie mills, etc.—thus serving a double purpose. Additional interest is lent to these machines by the efforts which are being made to develop the manufacture of alcohol in Natal for industrial purposes, articles with reference to which have appeared in past issues of the *Journal*. The engines which we pourtray in our present issue are driven by gasoline power, but gasoline engines can, we believe, easily be converted to use alcohol. We should thus be able to manufacture our own fuel, so that no oversea purchases beyond the importation of the tractors themselves would be necessary.

Testing for Phosphates.

The Commissioner of Mines (Mr. Chas. J. Gray) sends us the following notes on testing for phosphates which will be found valuable by those interested in the discovery of mineral phosphates, deposits of which are to be found in many parts of the Colony:—(1) Place a drop of dilute nitric acid on a piece of glass (preferably a microscope slip) towards one end from the centre. (2) Place a very small drop of ammonia solution towards the other end. (3) Scrape a little powder from the sample with a penknife and place it in the drop of nitric acid. (4) Place a very small amount of powdered ammonia molybdate in the drop of ammonia. (5) Heat the piece of glass from beneath, say over a candle flame, and while hot let the drops of ammonia and nitric acid run together and then continue heating till the slide is nearly dry. (6) If the sample contains phosphate a yellow precipitate will be formed when the drops mingle or later during the concentration of the solutions owing to heating. *Cautions:* (a) The amount of nitric acid must be distinctly greater than the amount of ammonia, otherwise a precipitate may be formed not due to phosphate. (b) Do not mistake the yellowish white deposit as the molybdate dries up for a phosphate precipitate. The drying molybdate deposits at the edges of the drops, while the precipitate which is a very distinct yellow, forms in the liquid. *Notes:* (a) Pieces of glass

tubing are very convenient for placing the drops on the glass. After one end of a tube has been placed in the liquid, the finger held over the other will prevent the liquid dropping out prematurely during removal. (b) A solution of ammonia molybdate may be used instead of making the solution on the glass for each test, but a made-up solution does not keep well, losing its strength and becoming charged with a yellow sediment, which may possibly be mistaken for the phosphate precipitate if it gets on the glass.

Foods for Milch Cows.

The question of the best feeding of milch cows is one of perennial interest to the dairyman. Food has a close relation to the milk output and to its constituents as well as to the condition of the cow, and it is worth the dairy farmer's while to study the nature of foods and to test the effects of the provender he gives his stock by the results in the milking shed. *Dalgety's Review* in a recent issue has a brief but interesting article on this subject. The *Review* points out that, by knowing the chemical elements in the various kinds of food, the farmer can better supply those substances that his cows need to enable them regularly to give their full measure of good milk. Protein, for instance, our contemporary reminds us, makes blood and tissue, and is one-fourth of the solids of the milk, and carbohydrates create heat and energy, and the fatty matter in the food will produce fat both in the animal and in the milk. Consequently, the *Review* continues, to know the value of foods in relation to these properties in them must be useful, and the differences in them is very marked. Green lucerne, for example, contains per ton 78 lb. of protein, 254 lb. of carbohydrates, and 10 lb. of fat; while bran has 244 lb. of protein, 772 lb. of carbohydrates, and 60 lb. of fat; green peas and oats, 30 lb. of protein, 142 lb. of carbohydrates, 4 lb. of fat; and cotton seed meal, 744 lb. of protein, 338 lb. of carbohydrates, and 168 lb. of fat to the ton.

It is evident that the condition of the cows and the quality of their milk supplies must be affected by the differences in these foods, and a careful adjustment of them in the daily ration may produce very beneficial effects. When the cows are feeding on rich natural pastures, and the grass or lucerne are abundant, a healthy, well-bred cow will give its fair complement of milk, but even then it may be benefited and stimulated by an occasional ration of bran or corn chop, the latter having 158 lb. of protein, 1,334 lb. of carbohydrates, and 86 lb. of fat to the ton; or a cottonseed meal or some other food abundant in those vital elements that tend to make it productive; and when the pastures are brown and scant, and it becomes a necessity to provide artificial food for the stock, for economy's sake, as well as for the purpose of keeping up the milk supplies, it is of great importance to know the variant value of foods. Of all hays,

lucerne stands the highest, containing 200 lb. of protein, 792 lb. of carbohydrates, and 24 lb. of fat to the ton. Oat hay may be richer in carbohydrates and fat, and red clover in fat, but for protein it stands in the top place. And there are many other valuable foods, such as corn stover, ground barley, oil meal cake, each with its distinctive qualities, and possessing in various proportions those substances that build up flesh and energy and supply the lacteal ducts with their flows of milk. The best foods may not make a poor ill-bred cow marvellously productive, but they will give to every cow in the herd the fullest chance of doing well up to its capacity and making it a source of profit to the owner.

Paper from Maize Stalks.

In connection with the article on the subject of the manufacture of paper from maize stalks which appeared in our last issue, the following memorandum which the Commercial Agent has received from the United States Department of Agriculture at Washington will be read with interest.

The memorandum states:—"That good paper can be made from corn [maize] stalks was proven long ago. The Government's present experiments which are being carried out by the Forest Service and the Bureau of Plant Industry in co-operation are merely to obtain authentic data on this subject, and to determine if possible just what is necessary to make the manufacture of paper pulp from corn stalks a commercial success. The corn stalks thus far experimented with have been those grown locally during the season of 1907, but there is no reason to suppose that the material grown in the corn belt would not yield fully as good a product.

"The stalks are received at the laboratory in bundles which are opened out and shaken to remove loose dirt. They are then cut into short pieces and washed to remove as much field dirt as possible, and are then ready to put into the digester for cooking. Before the regular cooking process is commenced the stalks in the digester are extracted several times with water and live steam under 10 to 25 pounds pressure. This removes much soluble material containing most of the nutritious matter originally present in the stalks, and after partial evaporation of the extract it could probably be used as cattle food. After the extraction with water is completed, the caustic soda is added to the material in the digester and the regular cooking process is proceeded with. The cooks made have varied from several hours at 95 pounds steam pressure down to one and a half hours at 110 pounds, and the caustic soda used has been from ten to twenty-five per cent. of the bone-dry stalks removed. It is found that the best results are obtained by using about 15 to 10 per cent. of caustic soda and cooking about two hours after a pressure of 110 pounds is reached.

"After the cook is completed the fibre is blown out of the digester into a vat with a false bottom which allows the waste liquors to drain away. The material is washed in this vat with hot water until the waste liquors, which are very dark brown, are removed, and it then goes to a specially constructed screen which separates the pith cells from the long fibre. This process is necessary as the pith cells tend to make the paper harder than is desired to many grades. The fibre, after separation of the pith, is found to be long and strong and could be used for nearly any grade of white paper as it is found to bleach easily with seven to twelve per cent. of bleach. It could also be employed in the unbleached state for wrapping paper, and with the addition of ground wood for the production of cheap printing paper. The pith pulp in its dry state is very hard, and in some ways resembles horn; it has limited water and grease proof qualities, which might make it of value in certain grades of wrappings. Its remarkable bending qualities when slightly moist would probably make it serviceable in the production of box board.

"From the results of these tests already completed it is safe to conclude that one ton (2,000 lbs.) of bone-dry stalks will yield about as follows:—Food extract, 300 lbs.; long fibre, 300 lbs.; pith, 600 lbs.; waste, 800 lbs."

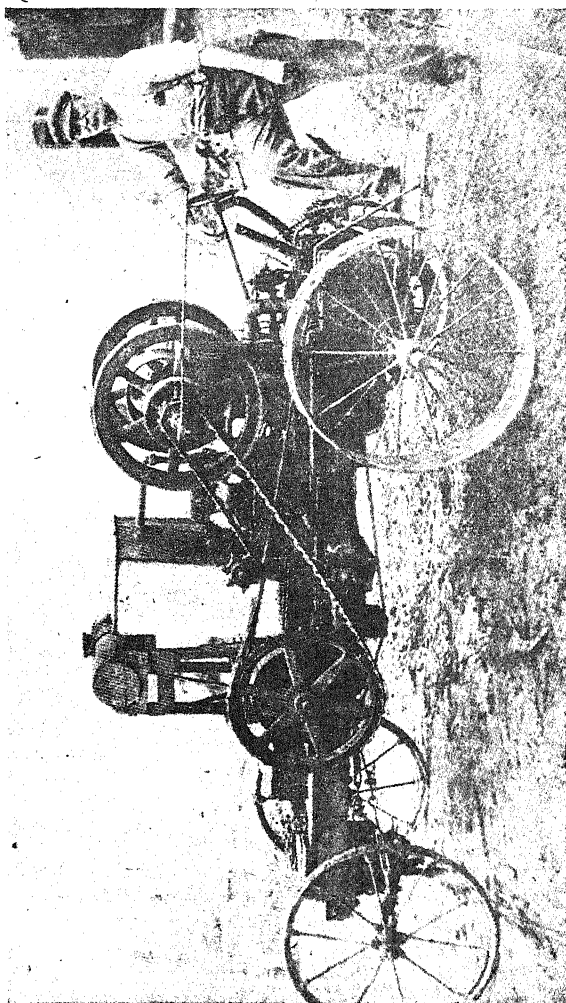
East Coast Fever Regulations.

Since we went to press with our last issue regulations in connection with East Coast Fever have been made by the Minister of Agriculture under Government Notices Nos. 62, 74, 75, 76 and 77 of 1909. The first of these notifies, in connection with Government Notice No. 614 of 1908 (whereby the Minister prohibited the movement of cattle, with the exception of slaughter cattle under certain conditions, within Sub-division "Impendhle South," of the Magisterial Division of Impendhle, and whereby he defined the boundary of that Sub-division), that the boundary of Sub-division "Impendhle South," in so far as the boundary on the West and North is concerned, has been amended as follows:—On the West and North: From the Umkomaas River by the eastern and northern boundary of "F.P. 138" to the corner beacon of "M.G. 5," thence by the eastern boundary of "W.S. 1," thence by the southern and eastern boundaries of "M.G. 3," thence by the southern and eastern boundaries of northern portion of "F.P. 40," thence by the eastern and northern boundaries of "V.a.," thence by the eastern boundaries of "Belmont" and "M.G. 6," thence by the southern boundary of "F.P. 34," thence by the southern and eastern boundaries of "F.P. 37," thence by the northern boundaries of "Woodhouse No. 1," "Woodhouse No. 2," and "D. 2," thence by the western boundary of "D. 4," thence by the western boundary of "Wakofield" to the boundary between Impendhle

and Lion's River Divisions. The boundary on the North and East, and on the South, remains as defined in Government Notice No. 614, 1908.

By Government Notice No. 74, the Minister of Agriculture orders that from and after the 22nd February no movement of cattle shall be allowed within that portion of the Magisterial Division of Utrecht which lies to the east of a line running from the Transvaal Border along the western boundaries of the undermentioned farms and terminating at the Buffalo River:—"Nauwhoek," "Libanon," "Mooiplaats," "Arrarat," "Waterval," "Altemooi," "Tweekloof," "Langverwacht," "Uitval," "Uitzicht," "Noyesboom," "Vaalbank," "Tigerfontein," "Twyfelfontein," "Paardepoort," "Waaiohoek," "Klipspruit," "Geluk," "Ruigtefontein" and "Eersteling." Notwithstanding this prohibition, however, healthy cattle may be moved from one place to another within the said portion of the Division, for immediate slaughter, on permit granted by a member of the Advisory Committee for the Division, or by a person appointed by such Committee as a Permit Officer, and such removal shall be made within the time and according to the directions contained in the permit, and not otherwise. Permits for the removal of slaughter cattle by rail from any railway station in the said portion of the Division must be obtained from the Minister of Agriculture, and will be issued subject to such conditions as he may see fit to impose. In terms of Act No. 22, 1903, any person disobeying this order is liable to a fine not exceeding £100, or to imprisonment, with or without hard labour and with or without the option of a fine, for any period not exceeding six months.

Government Notice No. 75 declares that the farm known as Lot 49, or "Williamson," the property of Mrs. Black and Mr. James Geldart, situated in the Lion's River Division, shall, for the purpose of the East Coast Fever Acts, be deemed to be a portion of the Magisterial Division of Impendhile, and all restrictions or regulations which now or hereafter may be in force in the Magisterial Division of Impendhile shall, in like manner, be in force as regards that farm. By Notice No. 76, the Minister of Agriculture excludes Sub-division No. 3, Camperdown Division, from the operation of the Order given in Government Notice No. 681 of 1908, whereby the Minister ordered that all cattle in the Magisterial Division of Camperdown were to be forthwith branded. By Government Notice No. 77, the Minister orders that no movement of cattle within Native Locations and Native Reserves situated in Districts in which the movement of cattle has been prohibited, or in Districts in which such movement may hereafter be prohibited, shall be allowed to a greater distance than two miles from where they have been previously pastured or watered except under permit granted by an officer appointed by the Minister for Native Affairs for the purpose of issuing such permits.



AUTOMOBILISM AND FARMING.—II.

A Home-Made Gasoline Tractor.

Maize Values and Exportation.

HOW PRICE-LEVELS FLUCTUATE.

By H. J. CHOLIS, F.S.S.

THE price of a commodity, as doubtless everyone is aware, is fixed by the relation between supply and demand: the greater the supply the lower will be the price, and *vice versa* the smaller the supply the higher the price. With this principle in mind it will be of interest to examine diagrammatically the relations between exportation and local prices as observable in the maize market; and additional interest will attach to such an examination by reason of the recent advance in the local price of maize—due either to over-shipment or to “cornering” of the market (as has been alleged in the daily press). In this study I shall be doing no more than illustrating well-known facts of particular local interest at the present time by methods well-known to students of economics. Economic problems are, up to a certain point, more easily studied with the aid of geometry than, perhaps, by any other method. Where the limitations of plane geometry prevent the adequate treatment of some of the many complicated questions involved in the science of economics, the extra facilities offered by solid geometry may be requisitioned.

I.

In our examination of the factors which govern the fluctuation of price-levels we shall make use of diagrams, commencing with a simple one and advancing to more complex ones as the problem itself becomes complex by reason of the fresh factors that have to be taken into consideration as we advance in our study. In these diagrams, throughout, prices are measured on OX (see Fig. I.), on an ascending scale from O; whilst OY is used as a basis of measurement for the grain. The same lettering is used throughout all the diagrams.

A demand curve is drawn relative to the axes OX and OY; and in order to explain the function of this curve we may draw an ordinate at A—i.e., at right angles to OY and meeting the curve at P. The vertical height of P represents the price per muid of OA muids of mealies unaffected by any outside factors. The smaller the available supply of mealies, the greater will naturally be the price. If the available supply is OS, the price per muid will be seen to materially increase—to T. The curve CC is not supposed to be an accurately plotted curve of demand—nor is it necessary that its accuracy should be more than approximate. The shape and direction of a curve of demand varies, naturally, with the commodity to which it refers; and in this particular case the curve will be found to represent the conditions sufficiently well for our purpose.

In Fig. I. we may consider a country in which there are neither exports nor imports of mealies. The extent of the crop is indicated by the distance of A from O; and the price per muid is shown by the point of

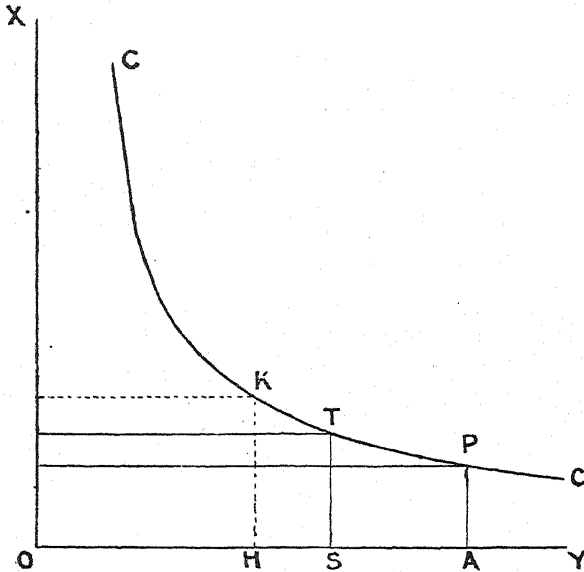


Fig. I.

intersection (P) of the ordinate from A with the demand curve. OH is taken to represent the amount of grain required for our own local consumption. It will be evident—as shown by the diagram—that, if the available stocks in the country were only sufficient for our own requirements (OH), the price would be much higher than if a larger supply of grain than we required were available (compare the relative heights of K and P).

What happens in the case of a shortage in a crop is shown in Figure II.

In this diagram OA, as before, represents the actual crop; and A2 is taken as indicating the relative extent of a normal crop—or what OA would have been had not certain factors, (*e.g.*, drought; untimely rains) intervened. As OA represents the available stocks in the country, we must include imports by adding them to the right of A—shown in A1. The effect of importation is seen to lower prices; and the more grain imported the lower falls the price of the commodity.

II.

When we come to consider exports, we must, in fixing the point A, take our imports (for home consumption) into consideration: that is to

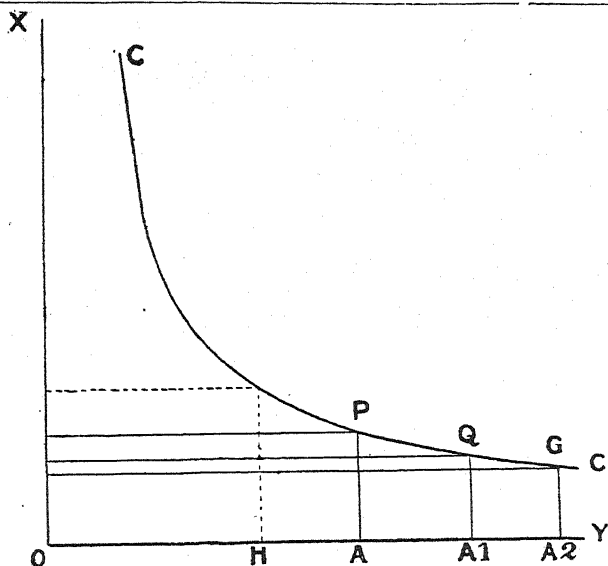


Fig. II

say, we must, as before, add these imports to our production, which will bring A correspondingly further to the right—away from O.

We measure our exports along AO, from A towards O. Let AM, in Figure III., represent the total exports for the season at any given date; then OM will represent the quality of mealies still left in the country.

Irrespective of certain factors, which will be considered later, it will be observed that, with the movement of M towards O corresponding with the increasing total of exports, the local price is automatically raised up the curve. When M coincides with A (in other words, when there is no export) the demand is only a local one; but directly M shifts towards O—that is, as soon as the demand created by the opening up of an export trade is felt—the rise along the curve effects a rise in prices. It does not matter what the overseas price may be, except that the rate at which M shifts to the left is governed in direct ratio by the excess of that price over the local price. That rate will gradually diminish as the local price approaches the overseas price, for there will be a slowly increasing tendency to cease exporting, as a result of the enhanced home prices. (Of course, while export is going on, local consumption is proceeding, but this fact cannot be taken to influence the price of the remainder, because wants are being satisfied—the local demand is decreasing.)

Supposing that the overseas price is R, the price which will be realised for the goods exported will be RN in excess of the local price (MN). The position may be expressed in a different way, in order that its significance may be better understood. If N is the local price and R the overseas price, it must be evident that we are receiving for our grain a price equivalent

to that which the goods would fetch were there no export and were the actual local supply to the extent of OS only.

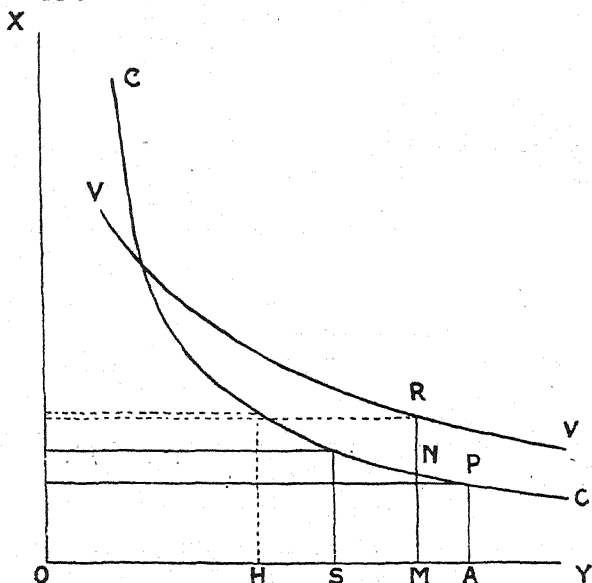


Fig. III

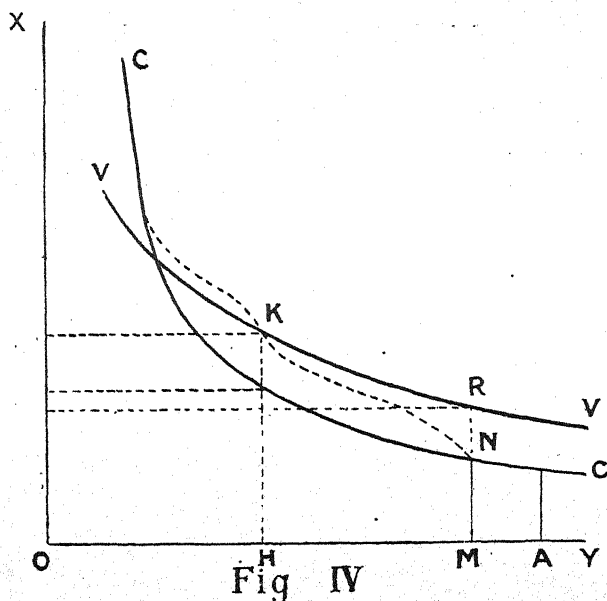
The position of R, of course, gradually changes, according to overseas market conditions. Doubtful American, European, and Argentine crop prospects have been gradually raising R; and whilst Natal's supply is too small itself to affect R, we nevertheless benefit by any increase in prices overseas.

To indicate changes in the position of R—in overseas prices—we draw another curve, VV (see Fig. III.), representing the overseas demand. It would seem, from the fact of our drawing this curve that the demand which it represents is related to our own stocks—indicated by OA. The only real relation it does bear to any part of the diagram, however, is to the price-axis OX. With the movement of M away from A prices go up—not on account of the volume of our exports, but because the trend of the London curve is upwards by reason of conditions extraneous to Natal.

III.

We have now to include a factor which we have been compelled so far, for the sake of clearness, to leave out of consideration. This factor is the potential value of HM, which varies with R. It will be evident that as exportation proceeds all the remaining maize that is available for export will bear an enhanced value. This theoretical price, if not as high as R, will be much higher than the local price; and although it will not necessarily be realisable locally it will nevertheless enhance the local price to a certain degree.

This influencing factor and its relations to the Natal* and oversea curves may be represented graphically by another curve—shown dotted in Figure IV. In fixing this curve we must take a point on the oversea curve where it would be cut by an ordinate from H, at which point the new curve will intersect the oversea curve. The reason of this is that we do not, in the ordinary course of things, export grain that we require for home consumption; and in order to prevent such an export, prices



must go up—which they will do automatically—to a point at least corresponding with the oversea price.*

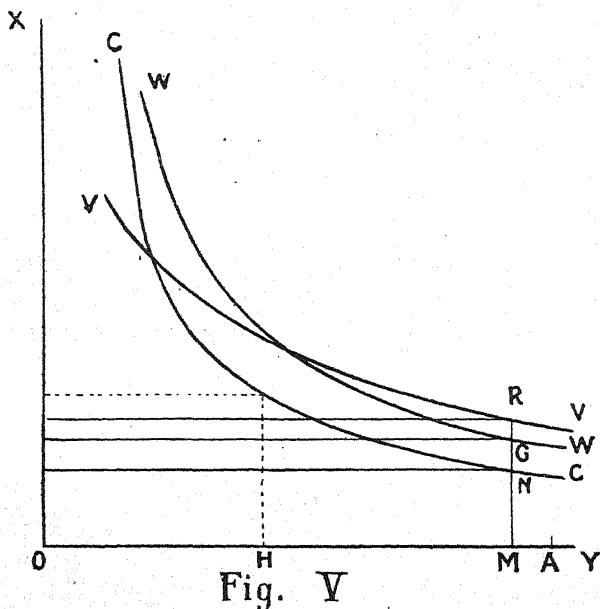
Now, after the new curve has passed K its trend must be upwards, in order to keep it above the oversea curve, but its tendency will be to seek, as far as the presence of the oversea factor will allow, the normal Natal curve. We thus get a curve something like that shown by the dotted line above K in Figure IV. The section between K and N must be more or less arbitrary, but the form shown will probably approximate fairly closely to the real conditions. A straight line joining the points K and N serves as a useful guide, but the necessity for the upward curve out of the straight will be understood, in as much as the bend constitutes a response to the attraction of the oversea curve. The proximity of this curve to the oversea one will probably, it may be remarked in passing, be governed by such conditions as Government assistance and facilities or otherwise offered by freights, etc.

* The Natal price would, of course, be more advantageous than the oversea price, from which latter, freight, etc., have to be deducted.

IV.

A consideration of the effect of crop conditions in each of the other South African States would form a further and highly complicated field of study; but for our present purpose we may treat the rest of South Africa as a whole.

There must be a demand curve for South Africa outside Natal, the height of which above our own keeps up our prices to an appreciable level. Large crops in the Transvaal and Orange River Colony very considerably affect this curve, and in 1907, when the export scheme was started, the prices of mealies in Natal would have been ruinously low had we not had a new market opened for us overseas. The same year there had been large crops in both the aforementioned Colonies; and had the large quantities of maize which we exported remained in the Colony the effect, with a limited overland market, upon our prices may be imagined.



In Figure V. a curve (WW) representing the South African demand (outside of Natal) has been drawn. AM now includes exports to the rest of the South African Customs Union in addition to exports to England. The ordinates in respect of the South African and overseas exports must, if an at all true conception is to be conveyed, coincide, cutting the demand curves of those two markets at G and R. The relative prices at the same date are thus at once determined, as also the Natal price (N).

V.

A point which has probably struck the reader in connection with the home and overseas curves is the position of their point of intersection re-

lative to the ordinate at H—the home consumption point. In other factor governs the position at which prices in Natal and London (say) words, what factor governs the position at which prices in Natal and London (say) are the same?

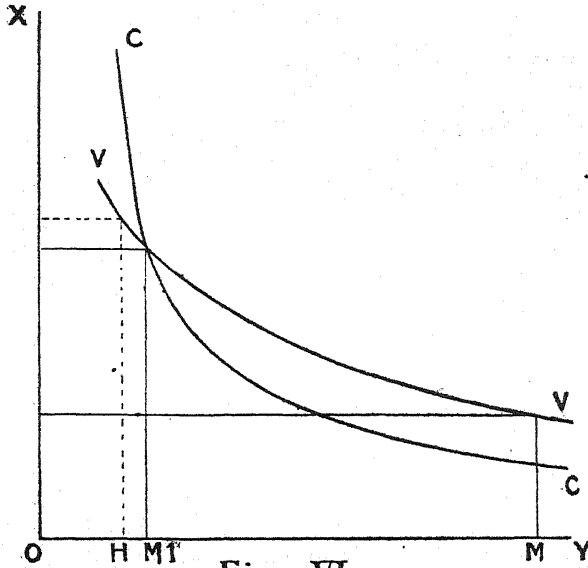


Fig. VI.

In Figure VI., when M reaches M1, prices will be equal, and it will not pay to export. Beyond that point M cannot go; for, although London prices may be steadily increasing, the London curve cannot, from the nature of things, again cut the Natal curve, so that it will be more profitable to keep our mealies at home.

Of course, an importation would shift M1 to the right again, but an importation is not likely to be large enough to make prices so low here that it will pay to export again.

In the second case—where the point of intersection is, primarily, on the left of the consumption point—reference may be made to Figure IV. In this case it will be possible for M to shift more or less rapidly to the left, until consumption-point is almost reached, when the Natal price at that point will be forced to rise, and export will automatically cease. The Natal curve will thus take a more or less sudden turn upwards from a point just before the ordinate at H, as already explained.

NOTES ON THE CURVES.

A few words on the curves which have been used in this article may serve to make their functions a little clearer. It will be remembered that 'OH' represents the quantity of maize required for home consumption.

Now in drawing the curve CC—which is to represent Natal market conditions—we must remember that to the left of the perpendicular HK the curve must rise with increasing steepness, on account of the fact that as our supplies of corn diminish below the quantity normally required for local consumption prices will very rapidly go up (see segment KC of curve CC). To the right of HK, however, the curve is not so steep, as the more grain we have above our normal requirements the lower will fall the price—but the price will fall only comparatively gradually.

With regard to VV, it will be noticed that this curve more nearly approaches a straight line than CC does and its slope is not so great. This is on account of the fact that the oversea market conditions which it represents are subject to changes which can only be produced by very large quantities of grain. For example, the production or the export of SM muids of mealies would produce far more appreciable changes in the Natal market than in the London market—more even than the difference between the slope of the portions of CC and VV subtending SM really indicate. (As a matter of fact, VV in reality much more nearly approaches a straight line—for such a short distance as OY—than I have shown, but I have been obliged to give a pronounced slope to VV in order to make clearer the facts which the diagrams are to bring out.) Again the quantity of grain in Natal below our own requirements, whilst having an important effect upon our prices, enhancing them greatly, will have no appreciable effect whatever upon the London market—see the curves CC and VV to the left of H.

The curve WW (representing the whole of the South African market) is much the same as CC, except that it is not so readily influenced by Natal conditions. As can be readily understood, the diminishing of Natal stocks will have a more and more pronounced effect upon South African prices generally.

CONCLUSION.

It is unnecessary to enlarge upon the beneficial effects which the recently organised exportation of maize will have upon the general trade of the Colony. Everyone who has given the matter thought will have perceived the necessity for export in order (a) to convert into hard cash the surplus of our crop over and above the amount we require for home consumption, and (b) to keep prices up to a moderate level; and this will be evident from the foregoing diagrams.

The writer does not pretend to have touched upon the question of maize export except in a few of its aspects; but many though the imperfections of the present article may be, the writer trusts that he has, at any rate, given readers interested in economics an idea as to how economic problems can be graphically represented and solved; and if his treatment of the relations between exportation and local prices arouses some interest in this method of economic study, he will be satisfied.

Maize-Stover.

By J. H. LILIENTHAL.

WINTER-FEEDING seems to have remained an unsolved problem in Natal, judging from the difficulties more or less every year to get stock over the time when the natural grasses are without food value. As a stock-raising country, with its staple maize, it is surprising that the stover is not utilised as it should be. Wherever feeding is done and maize can be produced, this is the principle roughage in the U.S.A. Apparently in Natal much money and labour have been expended in the introduction of foreign grasses, which as a whole have not given the expected results. The U.S.A., both north and south, especially the latter, have a large number of forage plants which thrive admirably; these are mostly raised for hay and baled for market, and maize-stover takes their place for feeding on the farm. Why stover has not taken its proper place in Natal, the only answer can be that it has remained unknown; one comes to this conclusion, from surmises that in the U.S.A. maize is cut down to escape the frost and to combat the stalk-borer. The prairie farmer, who produces maize for grain, would have no profit had he to cut, shock and husk his maize at a market price of, say, 25 to 30 cents per bushel, with labour from \$1 to \$2½ per day on lands costing from \$100 to \$150 per acre, even if he averaged 100 bushels per acre. Early fall frosts affect the maize crop in the north more or less every year, and, except through cultivation, steps for hastening maturity are not taken.

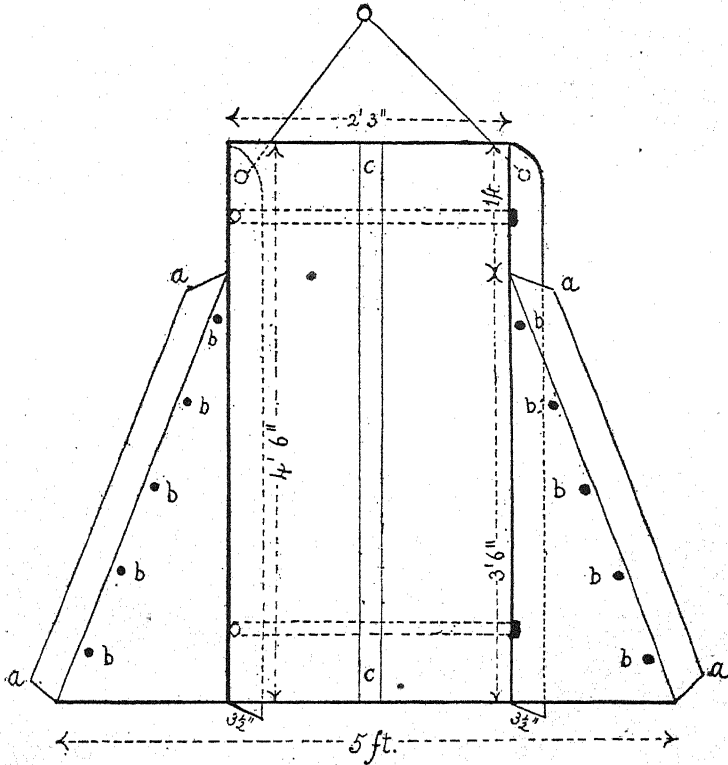
Timbered lands in the Corn Belt are mostly used for grazing. In texture and colour they resemble the subsoil of the prairie; both leechy and liable to washes on account of their broken surface, these soils are pastoral; and, perhaps also through their sheltered position, have become the home of the feeders. Only beef produced with grain is appreciated by the consumer: the objection to grass-fed meat is the shrinkage in cooking. Large self-feeders are placed in the pastures and filled with ear-corn and shelled grain; the cattle can help themselves at will, often standing knee-deep in the grass—which not infrequently is mown for hay while the animals are in the paddock. Here and there a corn and cob mill may be observed, also large galvanized tanks to sprout the maize before feeding, but the bulk is handed to the cattle as whole and dry grain, with hogs following to live on the droppings. Naturally the pastured land becomes very rich in time, and then is cultivated with maize; not only the production of this is used for feeding, many farmers purchase largely from the prairie and have their own elevators. While as a cash crop white varieties are preferred, the feeders mostly raise yellow maize, although

it has been proved that colouring matter does not affect nutrition. The practice of hiring the standing maize-stalks for pasture from the prairie-farmer has long since been done away with, partly owing to the maize-stalk disease, but more serious is the effect of tramping of stock during wet weather upon cultivation. To prevent the prairies from becoming compact, not only the stalks are ploughed in but also red clover is sown for this purpose; when one maize crop follows another, which rarely happens, the stalks are burnt, for otherwise the ground would become too loose.

When we learn that stover contains more than one-third of feeding constituents as compared with cob and grain, the cost of production being nil, the only expenses the labour for cutting and shocking, which in Natal falls at a time when other work is not pressing, the economic value is realised. The waste in feeding, said to be 30 per cent.—which the stock refuse to eat—appears at first glance high, but it must be considered that these tests were made in combination with grain rations. Tables showing feeding trials are right enough as a guide for fattening and dairying; for the purpose of keeping stock in condition during the winter months, observation may be worth more. In 1906 draught oxen were kept during the winter on stover only, particular care being taken that all ears were removed; doing light work seven hours per day the animals remained in condition. The following spring grass was plentiful; no paddock available near to cultivations, to work the oxen the customary nine hours in the field and bring them in from any distance, the then prevailing labour gave trouble. Stover was still on hand, and the oxen were handed it liberally while kept in the kraal during the night; the only time on the pasture was in the middle of the day, less than two hours. This was kept up till 7th November, when the stover was finished. Some of the oxen were actually fat; while a team on the same ground, doing the same hours and less than one-third of the draught, but out at night on the pasture, were rather the reverse in condition. That the maize from which the stover had been taken was cut at a ripe stage was proved, when seed was selected from the ears in preference to those husked from standing stalks after frost. The right time for cutting with the greatest advantage for both stalk and ear is when the grain has glazed.

Harvesting is best done by hand-cutting; the maize-harvester and binder is useful when a large area has to be cut down quickly, as when frost may be expected. The sheaves can well remain from four to five days on the ground before shocking, with the additional advantage that they are lighter to handle. Against the use of the harvester and binder are the price and complicated nature of the machine. Further, the cost of twine, which in Louisiana came to 40 cents per acre, and as the Southern States plant maize wide apart with one stalk to the hill, the cost would be higher still in the Corn Belt with closer planting and

coarser stalks. The accompanying sketch was taken from a home-made implement met with in the broom corn centre of Illinois. It is used for clearing the land from stalks, and as broom corn is tough, much resembling Kafir corn in its mature stage, it should answer well for cutting maize. Farmers approve of this implement, and evidently after this home-made pattern, manufacturers turn out machines on three and four



SLED MAIZE CUTTER.

aa, aa, 3½-ft. Knives—in this instance made from old cross-cut saws,
b, Bolts holding knives in place.
cc, Piece nailed over top for strength.

wheels, which, running lighter, are also devised to prevent the horse from getting against the knives when turning; a maize-cutter on two wheels is made with rails in front and on sides to prevent operators falling against the knives. Simplicity and cheapness are the consideration in regard to the cutters against the harvesters.

Whenever labour is obtainable in the U.S.A., harvesting is done by hand with the maize-knife, preferably by contract, payment being per shock of fourteen hills square. The labourer, going to the centre, twists

four hills crosswise for a standard, and proceeding from this cuts with a downward stroke surrounding stalks about eighteen inches above the ground; when a quantity is gathered against his left arm it is deposited against the standard. When the shock has half its diameter, he ties with maize stalks and again when finished: binder-twine, tar-rope or baling-wire is preferred for this last tying. The knife has usually a straight handle and a curved blade; with the down stroke men are said to have cut their legs, and this is much more likely to occur here with the careless Kafir and the feeble Coolie. To cut with a pull, maize-hooks are made from old scythe blades, and can also be ready purchased. Both knife and hook leave a high stubble, which in the U.S.A. is of no concern; the land is seeded with small grains, for which five-row drill machines fitting between rows of standing maize are used; when these small grains are to be harvested, the maize-stubbles have decayed and are no obstruction to the mowing machine. However, when another maize crop should follow, these stubbles would be objectionable; in ploughing some would be located at a depth from which the cultivator would drag them up and from under the row would tear out the young maize plant. The best way of

HARVESTING IN NATAL

is with a sharp hoe, as used by the natives in clearing their fields from weeds. Care should be taken that all operators are on the same sides of the rows, that stalks fall straight and in one direction, cutting level with the ground. Each day all stalks should be gathered before sundown into heaps convenient to carry to shock or lift up to wagon; thus these heaps can be left for several days, but if rain occurs they must be turned to prevent moulding. A few of the blades will be lost, but as the bulk of the feeding value is in the stalks, it is of no consequence considering the gain in lighter handling and rapid proceeding of cutting. As it is not likely that the stover will be handled to stock on the field, but in a paddock or stock-yard, it should be hauled to a place near and may then be put up in continuous rows, approximately the diameter of a round shock of fourteen hills square. Provided that it is not left after many rains in spring it will keep well. No tying as with round shocks will be necessary. The above-mentioned stover used till November was put up in round shocks and had several heavy rains on it; to the last it turned out, both in aroma and colour, like the best field-cured hay. The same shocks in the great humidity of the States along the Mississippi would have been in danger of moulding. Now the question arises, shall we use a shredder?

The North American farmer mostly feeds his maize as a whole, ears and stalks. This is termed fodder. This until conditions of weather do not permit work outside, and then for housing the feed the shredder is required; the waste in feeding stover shredded remains, but this turned

into barn-yard manure makes the handling easier than with the remnants of whole stover. Yes, some feeders assert that if for this latter purpose only they would get the shredder. Both housing of stover and bedding of stock would be of little or no account in Natal, and only the husking the shredder does would be of value; but, as stated previously, farm work is not pressing at that time of the year, and since husking pegs can be purchased locally there is little more trouble in removing the ear from cut stalks than from those standing in the field. Further, it ought to be well borne in mind that the cost of shredding is even somewhat higher than the expenses of preparing stover. There are many appliances in connection with preparation and handling of stover; most of these devices were the result of extreme scarcity of labour and dearth of same, so they need not be mentioned here. The appearance of shredded stover is similar to that of baled hay, as compared with shocked stover and stacked hay; it has a dead colour, probably caused through close packing. Men who keep horses at livery have stated that the baler presses the life out of hay; perhaps a similar change takes place as does with oats when crushed for feeding. Whole oats possess a peculiar, stimulating body called Avenin, which is lost when crushing the grain; chemical study was not able to reveal any substance of this nature; nevertheless praxis knows it exists.

SILAGE.

The waste in feeding silage is said to be five per cent.; but, added to this, the quantity lost in the silo, which with the greatest care cannot be avoided, it would probably approach the waste of 30 per cent. in dried stover. Field-curing is the oldest and best method of harvesting. Other systems originated in humid and rainy climates and where the sun is not powerful enough at all times of the year when crops are ready to be preserved.

As a guide as to how much stover the farmer should prepare for his stock, it may serve to mention that in Europe a cow can be kept in condition with 30 lbs. of good meadow hay daily, without other food. It is estimated that one ton of mixed hay is equal to three tons of maize-stover in feeding value, or one ton of lucerne hay is equal to four tons of stover; that in both its composition and digestibility maize-stover closely resembles timothy hay, and the edible portion of the stover has a nutritive value fully equal to that of timothy.

The Natal Government's second estimate of last year's maize crop was 820,000 muids. Supposing this had been raised at five muids per acre, with a yield of one and a half tons of stover, would give a total of 246,000 tons. The statistics for 1905 give 273,376 head of cattle in possession of Europeans, and, as this includes calves, the 246,000 tons of stover would give over six pounds of valuable roughage per day to each grown animal throughout an entire year.

Fish Guano.

By LOUDON M. DOUGLAS,

Lecturer at the College of Agriculture, Edinburgh.

THE enormous quantities of fish which are landed on the shores of the United Kingdom continue to increase year by year, and contribute very largely to the food of the people. Fish, in the complete state as taken from the water, are in daily use throughout the country, and the handling and distribution of these make up a gigantic industry, and indirectly give rise to many industries of a subsidiary character which are associated with the fish trade.

A large proportion of the fish caught, however, are not utilised at once, being cured or otherwise treated so as to delay the period within which they must be consumed; hence it becomes necessary to free such fish from offensive or useless portions which would interfere with their proper handling. In such parts as Aberdeen, Fraserburgh, Grimsby and many others, such residues amount to a huge bulk of material which has either to be utilised by some process of manufacture, destroyed by burning, or taken out to sea.

As a matter of fact large quantities are utilised for industrial purposes, and fish "offal" has therefore become an article of considerable value. In addition, however, large quantities of fish are condemned at various markets as being unfit for food, and these are also added to the raw material utilised for manufacturing purposes. This is more especially the case at the Billingsgate Market, London, which from its great size is more likely than any of the others to be the dumping ground for questionable fish from many quarters.

The utilisation of these residues in a scientific way was begun in 1862 by M. Rohart, who commenced the drying of the refuse heads and backbones of Norwegian cod on heated floors, after they had been sun-dried on the rocks. He subsequently ground the material obtained with mill-stones into a fine powder, and in this state it was long known to the market as Norwegian fish guano.

Subsequently, however, the process of manufacture was improved, as it was seen that the demand for fish guano was likely to increase owing to the failure of Peruvian guano supplies. Farmers preferred guano to artificial manures, and, in the absence of the natural product from Peru, they favoured the preparation from fish residues.

In this manner the demand for fish guano has increased, and at the present day continues greater than ever.

To make 1,000 tons of fish guano it has been computed that 7,000,000

cod heads would be necessary, and to obtain these 50,000 tons of fish would need to be caught. Such numbers strike the imagination as being gigantic. They are, however, not extraordinary when the actual facts are examined, as the harvest from the sea is reckoned in millions.

There are two principal kinds of fish guano, namely, that prepared from white fish such as cod and haddock, and the other "herring guano," prepared from residues from gutting and kippering herrings. But the herring residues contain a large percentage of oil, which is a serious barrier to the making of guano. The oil has first of all to be pressed out before the residues become available, and even then the product is much inferior to the guano prepared from white fish.

There is quite a number of fish guano works in the United Kingdom, and these are distributed pretty well over the whole country. The newest of these has been recently started at Fleetwood under the style of The Fleetwood Fish Meal Coy., Ltd., and their product is of a very fine quality, and can quite well be used for cattle-feeding purposes—feeding mixtures with a certain proportion of fish meal being quite common on the Continent.

The factory at Fleetwood, which was designed and equipped throughout by Messrs. William Douglas & Sons, Ltd., of Putney, London, who have highly specialised the manufacture of the various products derived from fish residues consists of a large rectangular building, of light structure and sheeted principally with corrugated iron. The kind of equipment necessary in such a place will be best understood by describing the process carried out.

The fish residues are first of all hoisted to the top floor, where they are passed through a "Douglas" cutter, which is so rapid in action that it can get through many tons of material in a day; it is difficult, in fact, to utilise it to its utmost capacity. This machine speedily reduces the material to a pulp, when it falls by gravitation into a 48-feet hydro-extractor, in which the excess of water present is removed instantly. When it is considered that the moisture present may amount to 60 per cent. and over, it will be seen how very desirable it is to remove—as can easily be done by a specially constructed hydro-extractor—a considerable portion of this, at least one half. The subsequent drying benefits to that extent.

When the residue has been partially dried it is then lowered and conveyed to one of the driers, of a construction which has been found to answer the purpose well. These driers are 12 feet long and $6\frac{1}{2}$ feet in diameter. In the middle is fixed a rotary spindle to which heavy arms are attached. One end of the spindle or shaft projects, and to this driving gear is attached, so as to rotate the arms slowly. The driers are steam jacketed and are capable of drying the semi-dried material into an impalpable powder in from six to seven hours. The quantity they hold is

from 30 to 40 cwts. each, and with a little experience it is quite easy to gauge when the process is complete. If too much heat is used the colour and quality of the product will deteriorate.

The most important attachment to a guano or fish meal drier is that which deals with the vapours. The odours which arise from fish-drying are most offensive, but they can be controlled almost entirely by the application of a forced exhaust produced by a fan and which causes the vapours to pass into a large volume of water, where the condensable vapours are absorbed, and the non-condensable vapours are held in suspension and may be run away in the waste water at once.

The time taken in drying has been a constant drawback in connection with these driers, many of which of somewhat similar design have been erected in various parts of the country. The adjustments, however, which these particular appliances possess enable them to reduce the time taken to a minimum.

The plant will be seen to be very simple, as, besides the apparatus mentioned, all that is required is steam and motive power.

The mechanical equipment of a modern fish meal or fish guano factory, therefore, consists of:—1, Steam engine; 2, boiler; 3, "Douglas" fish cutter; 4, hydro-extractor; 5, driers; 6, vapour condensers.

If this plant can be arranged on three floors so as to take advantage of gravitation, then economy of working is complete, and a perfect product will be the result.

Fish guano is sold on analysis and its value is estimated according to its constituents. The following is an analysis of a fair sample:—

Phosphate of Lime	17.28 per cent.
Nitrogen equal to Ammonia	10.50 per cent.
Water	18.98 per cent.

The guarantee in this particular case was:—

Phosphate of Lime	17.00 per cent.
Ammonia	10.25 per cent.
Water	19.00 per cent.

so that the bulk was well equal to the guarantee. The prices vary considerably, but may be set down as averaging 10s. per unit for ammonia and 9d. per unit for phosphate of lime. On that basis, therefore, the guano in question would be worth about £6 per ton, which represents a very large difference between the raw material, costing 10s. to 15s. per ton, according to locality.

The business is indeed a very profitable one when well managed, and there are many ports in the United Kingdom where fish guano factories could be put down with every prospect of converting fish residues, which are at present simply waste, into a highly remunerative product.

Lucerne on Sand-Reclaimed Areas.

RESULTS OF DURBAN EXPERIMENTS.

WE have been favoured by the Town Clerk, Durban, with the following copy of a report which the Inspector of Nuisances has made to His Worship the Mayor and Town Councillors on the results of the experimental cultivation of lucerne and other fodder plants on the sand-reclaimed land, Eastern Vlei, Durban:—

HIS WORSHIP THE MAYOR AND TOWN COUNCIL.

SIRS,—In connection with the experimental cultivation of lucerne and other fodder plants on the sand-reclaimed land, Eastern Vlei, by order of the Council, and commenced in March of last year, reports were submitted on the 20th July, and again on the 1st October, on the progress of the experiment, and I think that by this time such information has been obtained as will warrant extended cultivation to five acres for the present year. An early decision is desirable, as the preparation of the land is necessary within the course of the next few weeks if a larger area is to be cultivated.

The land, originally, was low-lying, wet, inclined to be swampy, and covered with rank grass and sedges. During the year 1906-7 the land was covered over and reclaimed with sand from the Ocean Beach hills to a depth of five feet or thereabouts. For the said experimental cultivation a small portion of the sandy land was fenced, and divided into plots. Four plots were manured with decomposed stable manure, and four plots remained without manure or other fertiliser.

Plots Nos. 1 and 3, manured, and 5 and 7 not manured, were sown with melilotus.

Plots Nos. 2 and 4, manured, and 6 and 8 not manured, were sown with lucerne.

All plots were sown in drills, 18 inches apart, on the 20th March.

Plots Nos. 1 and 5, melilotus, and 2 and 6, lucerne, were specially watered for three months after sowing. The remaining plots received no watering or other attention.

Hot winds in April, and the fine drifting sand, injuriously affected the young vegetation, more especially the melilotus, and all the unmanured plots contained some permanent blanks.

As the melilotus has not ratooned after cutting, it may be left out of consideration as a plant for further cultivation.

The following show the results of the experiment, the weights given being those of the crops when cut and green:—

MELILOTUS.

Plot 1: 82 square yards. Crop cut August 15th to 29th, 326 lbs.

Plot 3: 123 square yards. Cut August 26th to September 3rd, 329 lbs.

Neither plot ratooned after cutting.

Plots 5, 108 square yards, and 7, 156 square yards, were allowed to go to seed. The melilotus is now dead, and it appears as if the seed which fell on the ground is not going to grow to any considerable extent.

LUCERNE.

Plot 2: Manured, and watered three months, 109 square yards, reduced to 100 square yards by a heavy rainstorm in April:—

WHEN CUT.	Lbs. Weight.
July 14	213
August	193
September 23	231
October 26	256
November 26	275
December 20	241
January 11	170
Total	1,579 lbs.

Plot 4: Manured, not watered, 110 square yards:—

WHEN CUT.	Lbs. Weight.
August 11	130
September 14/17	221
October 20	258
November 29	325
December 12	300
January 1	240
January 22	159
Total	1,633 lbs.

Plot 6: Not manured but watered for three months, 100 square yards:—

WHEN CUT.	Lbs. Weight.
August 11	56
September 18	54
October 27	177
November 24	150
December 14	151
January 3	121
Total	692 lbs.

Plot 8: Not manured and not watered, 134 square yards:—

WHEN CUT.			Lbs. Weight.			
August 11 ...	...	...	...	110		
September 14/17	...	...	...	191		
October 27	...	...	...	213		
November 23	...	...	...	220		
December 16	...	...	...	251		
January 5	...	...	...	204		
Total			...	1,189 lbs.		
TOTAL WEIGHTS.			Equivalent Weight per Acre.			
			Tons. cwt. qrs. lbs.			
Plot 2—1,579 lbs.	...	...	34	2	1	11
Plot 4—1,633 lbs.	...	...	32	1	2	4
Plot 6— 692 lbs.	...	...	14	19	0	5
Plot 8—1,189 lbs.	...	...	19	3	1	22
Total 5,093 lbs.						

Total area: 14 perches 21 yards, or about one-eleventh of an acre.

The lucerne produced looked of quite as good quality as that on sale in Durban, but it may be that it has not the same feeding value as stuff which has not had such a forced or rapid growth.

The crop, 275 lbs., taken off Plot 2 in November, was dried sufficiently for baling, and made sweet hay, but it then weighed only 50 lbs., having lost 225 lbs. in the drying process.

The price of green lucerne in Durban, to be supplied all the year round, is three shillings per cwt., but the market is limited. As the requirements of all the Corporation departments for lucerne hay, fodder and grass hay amounts to about 490 tons per annum, there is, however, a considerable present outlet for green and baled lucerne.

It may be asked why the lucerne was cut so frequently. The answer is that during the earlier crops, and up to and including October, the lucerne was cut when it was falling over or showing signs of withering underneath, and since such month the crop has been cut when breaking into flower.

The roots of the lucerne are now over $2\frac{1}{2}$ feet deep, and have not yet reached the original vlei surface.

I was not prepared to find that lucerne would grow profitably on what appeared to be sterile sand, but it is proper to bear in mind that in reclaiming the land quantities of the ashes or decomposed town rubbish from the banks at the depot were also removed with the sand-hills, and it seems to me that it is this ash or decomposed refuse which gives the land its fertility, and produces what everyone must admit a growth of surprising luxuriance.

It will be remembered that the remainder of the reclaimed land, up to the depot road, was covered with a coating of town refuse, laid down and spread as collected to prevent the sand from drifting and to promote vegetation. These objects were fully effected.

There are 15 acres of such reclaimed land available for cultivation.

The strong fencing required for enclosing the suggested five acres will cost about £20, and implements of cultivation £6.

It will be necessary in any operations to ensure that the land is prepared and maintained in such manner as will prevent the sand from drifting, and for that purpose the surface must be top dressed with manure, or with a coating of the ashes before-mentioned, abundance of which ashes are available and close at hand.

I beg to recommend the suggested cultivation to your favourable attention, which cultivation can be carried out by this department.

With regard to other agricultural experiments, lucerne sown on the Western Vlei reclaimed with sand was a failure; the seed, which was sown early in April, germinated, but did not continue to grow. Some sugar cane planted on the Eastern Vlei unreclaimed vlei land was also a failure, owing to the continued heavy rains following the planting, and drainage of the land being impracticable. Some mealies on the same kind of land are also poor. Teosinte, sown on the reclaimed Eastern Vlei land, and in the same enclosure as lucerne and melilotus, is, however, very promising, and has already produced a great weight of green fodder, as follows:

Plot No. 9: Manured, 142 square yards. Sown October 29th, cut as required between the 22nd December and the 17th inst., 1,387 lbs.

Plot No. 10: Manured, 162 square yards. Sown October 9th, cut as required between December 7th and the 19th inst., has given 2,473 lbs.

The plots have been cut twice and three times respectively.

Teosinte has a leaf like the mealie, but stools very well, some roots having as many as fifty stalks. It appears to be a good green feeding stuff, and would probably be suitable for ensilage.

I am indebted to Mr. Herman Konigkramer, of Westville, for kindly letting me have the teosinte seed, who has had it under cultivation for the past few years with most encouraging results.—Yours obediently,

(Sgd.) W. C. DOUGHERTY,

Inspector of Nuisances.

Though it is well known that poultry need sharp grit to grind their feed, yet many a flock is deprived of this necessity.

A Much-Neglected Manure.

By ARTHUR E. DIXON, F.G.S., M.E.

ALL soils contain more or less iron as a constituent but iron is not always in a form to be readily taken up by growing plants. This being so, a crop that requires much formation of green chlorophyll requires iron sulphate.

Chlorophyll is a substance of primary importance in every plant, giving rise in the first instance to starch, woody fibre, fats and carbohydrates generally. Where soils are deficient in these ingredients or where iron is not in a proper form of root absorption it must be added. No amount of phosphates or nitrates or ammonia will replace this ingredient. Half a hundredweight to the acre is a most beneficial manure for mealies, beans, potatoes, sugar cane, and all crops heavy in sugar and starch.

Maize or such plants as are soluble in dilute acids or alkalies represent those constituents which are readily digestible in the bodies of animals. These crops are highly benefited by the application of sulphate of iron. They are:—

Maize in soluble carbohydrates	...	...	68.5
Oats do do	...	...	53.8
Wheat do do	...	...	68.1
Wheat Bran do	...	...	49.8
Barley do do	...	...	63.7
Rye do do	...	...	63.0
Lucerne do do	...	...	33.47
Potatoes do do	...	...	21.36
Peas do do	...	...	52.5
Turnips do do	...	...	5.3
Swedes do do	...	...	7.3

Generally speaking, when your crop is yellow and sickly it is lacking sulphate of iron, to give it a vegetation and to increase the percentage of albuminoids and soluble carbohydrates, therefore giving you a more valuable food. Take for example a potato crop. The crop was dressed after a wet day with $\frac{1}{2}$ cwt. of sulphate of iron (mixed with 5 parts of sand so as to sow evenly). This yielded 9 tons of potatoes. The same amount of ground was tried with 2 cwt. of kainit and only yielded 6 tons. Those who have visited the great potato-growing lands around Ingogo will find the soils rich in iron compounds. This when manures are added shows the beneficial results, as sulphate of iron is a strong antiseptic. It has been proved by tobacco growers that a mixture of—

- 4 Parts of Sulphate of Potash
 1 Part of Iron Sulphate
 1 Part of Ammonium Sulphate

has proved the best manure for the tobacco plant. As the ashes of tobacco plants give—

Iron Oxide	...	...	...	6.30
Potash	...	...	...	30.69
Lime	...	...	...	31.89

the using of lime and iron increase the leaf and adds to the quality of the ash.

Sulphate of iron as an antiseptic can be used as follows:—

- 1 Part of Iron
 2 Parts of Water } Destroying insecticide on vine and mildew.

Iron sulphate destroys the potato disease, acting on the cellulose walls of the hyphæ of this fungoid growth. It also destroys wheat mildew and the smuts and parasites of most cereal crops. It is therefore advisable for farmers to steep their seeds four hours in a ferrous solution about 1 per cent. strong before using. This will rid them of any spores or parasitic fungi.

Half a pound of sulphate of iron dissolved in one gallon of water applied to farmyard manure before using will often give good results for much of the spores, and parasites lie dormant till the spring and then infest the crops from the use of manures holding germs.

If you have an excess of iron sulphate on your land the antidote is easy: It is simply to add lime. Iron sulphate is not a stimulant but a direct plant food, and if mixed with 5 to 1 of sand to have it distributed evenly and sown over the crop after rain when well out of the ground the result will be marked. As it is not a costly manure it ought to be largely used in horticulture as well as agriculture.

“South Africa was a wonderful agricultural country. He believed that the Northern Transvaal would one day become a famous cotton country. When the undeveloped resources of South Africa were cultivated, it was going to be one of the great agricultural countries of the world, but that would depend upon the farmers, and still more upon their sons. None of their difficulties were insuperable, provided that their physical and intellectual energies were exerted to the utmost.”—*Lord Selborne at Stellenbosch, 28th January, 1909.*

Rice and Its Cultivation.

By J. J. DONE.

RICE with husk is called paddy, which is used for sowing purposes as well as for feeding to cattle and poultry, and after the removal of the covering is styled rice, which does not germinate. Thus runs the order—ear, paddy, raw rice (husk and bran are simply removed, used for making pastry, also it goes by the well-known name of table white rice), boiled rice (paddy being boiled, dried and pounded) and cooked rice for immediate use at table. Hence paddy-cultivation, paddy field, paddy merchant, and rice dealer are respectively termed.

It is against English idiom to say butter and bread but bread and butter; so the phrase rice and curry follows the suit.

ORIGIN OF PADDY.

At Oriza, in the valleys of the Himalayas and in some other parts in India, the wild paddy has been growing from time immemorial, and even at the present day, poor people gather the same species with a kind of net at every harvesting season near the giant of mountains.

The grain in question has a long tail about two inches in length, the male sign is at the bottom, and the female mark appears on the top. Each shoot has a single sign. The rice is red, and it has peculiar, delicious taste indeed.

Some treatises affirm that the paddy at present under cultivation ought to have originated from the aforesaid wild kind, though the former varies in size, taste, flavour, nourishment, and colour, according to the nature of soil, water, clime, and of the mode of culture mainly.

On account of the Orizan stock, the cultivated paddy is known by the appellation of *Oriza sativa*. Apart from this, other authorities state that some varieties of paddy have short tail, others bear none at all, the sign of male and female is found on each shoot, so on these grounds the different adopted kinds must have owned some other species that is extinct now. It requires further deep research in future to clear the doubt; at any rate it is an admitted fact, according to botany, that the paddy under plough is akin to a jungle parent.

SPREAD OF PADDY.

It is to be noted from the preceding that paddy originally sprung from the Indian soil, and it spread to China in 2822 B.C. Rice commerce was transacted between India and Rome, when the latter was in the zenith of her prosperity.

The introduction of paddy to foreign lands is as follows.—The Arabs, through the intercourse of trading, took paddy to Persia and

Arabia, from these countries first to Egypt, and then to Sicily, from there to Spain by the Moors. We find during the 8th century paddy made its first appearance in Spain, where at the beginning of the 15th century its cultivation was widely encouraged by the Government, but in 1523 it was discontinued through some misconception similar to the contempt for potato use in the olden days. Again in 1662 it was revived to grow on high grounds as well as outside of towns. Thence paddy was taken to the Straits and to some islands. In 1521 Charles V. of Italy introduced paddy into his dominion. In 1647 Governor Barkeley brought 100 measures of India-paddy from England to Virginia, but it did not settle steadily on the American shores till 1694, when a ship on her voyage from India was driven by hurricane near the coast of Carolina. The captain gave some paddy to one Mr. Smith to be sown in a suitable spot in his garden. In 1745 Carolina-paddy began to spread largely over the New World. The rice is larger, whiter and more nutritious than other kinds, so it excels them all, though its being of Indian source. This marked excellence speaks for its excellent, advanced culture. In 1718 and 1772 two varieties, one for high land and the other for low ground, were sent from Cochin China to America. Indians raise patches of paddy here and there in Natal too.

It is almost superfluous to pass further remarks on the extensive cultivation of paddy in Asia, and about its spread to the other four Continents. To be brief, paddy grows splendidly in the north of the Eastern Hemisphere as far as 45 deg., and south 38 deg., and in the north of the Western Hemisphere up to 36 deg., and south 38 deg., from 60 to 80 deg. of warmth requires to make the grain ripe, more heat does no injury, yet less checks the process. Paddy thrives well on an elevation between 7,000 and 10,000 feet above the sea level, also it gives harvest near coasts where the tide rises about 2 feet.

UTILITY TO MANKIND.

Among the cereals, rice is a more staple food to man than any other grain, indeed it is the chief article of diet to 54 per cent., or more than half of the population in the world. According to statistics, rice consumption is advancing by degrees among the nations of Europe. A dish of good rice and nicely prepared curries is a treat to a European who is accustomed to Eastern life. All about the coolness of the fields where paddy sprouts, the green-carpeting verdure of this blessed grass, the pleasing sight of harvest, and its untold usefulness to human beings, have been beautifully sung by Indian poets-laureate of repute.

STERLING VALUE OF AGRICULTURE.

There is a false sentiment, especially among the majority of the "rising generation" to look down upon agricultural pursuits as a mean occupation or only a waste of time.

The plough is nobler than the quill; as the greatest South Indian poetess says that the food procured by serving is not so sweet as that of the plough, I dare say that the plough in a literal sense is the supporter of the State. Ancient chronicles inform us that the dawn of civilisation started on the banks of rivers, where the husbandman tilled the ground and "cast his bread upon the waters." Nay, the progress of nations in civilisation can be measured by the amount of attention given by them to the cultivation of the soil. Savages may manage to exist without use of the hoe or the plough, but so long as they neglect the land, so long will they remain in barbarism.

What does it signify the boast of the Aryan's pedigree: "The term Aryan in modern Sanskrit means noble, of good family. The word is probably connected with the root *Ar* which, in both Greek and Latin means plough, and appears in English in the word ear-th, literally what is ploughed, from an old English word 'to ear,' meaning to plough. The Aryans perhaps used this word to distinguish themselves, as an agricultural nation with a settled home, from the wandering Tartars that surrounded them."

In short, it is the bounden duty of every civilised person to encourage the advancement of agriculture, for "the prosperity of a country depends much on the agricultural resources and its commercial transactions," as Adam Smith says in his "Wealth of Nations." "Agriculture," observes Washington, "is the most useful, the healthiest, and the noblest employment of man."

I have briefly described the leading details of paddy, and the general benefit accruing from agriculture, which to some may seem trivial, but which to the industrious, generous lover of Nature are the most important. Many know that there was once a famous man by the name of Dr. Johnson, but few are acquainted with his works; likewise all are aware that agriculture is very essential, but only a small minority pay due attention to its development, and support it as it deserves.

Animal food is a stimulating element in the ration of the fowls and in winter must be supplied artificially. This may be done in a limited way by saving up the meat scraps from the table or the refuse from butchering, but the most satisfactory way to do is to buy a bone-cutter and grind up bones, meat and all.

A Year Among the Orchards of Nova Scotia.

By CECIL H. HOOPER

(A Paper Read before the Royal Horticultural Society, London.)

(Continued.)

YOUNG orchards, say for the first 12 years, generally have some crop grown in them such as early potatoes, maize, beans, and other hoed crops. These crops need cultivation during the early part of the season and are removed about the middle of July or first week in August. Buckwheat and oats are also grown but are not as satisfactory, as the land cannot be thoroughly worked. Some space is allowed around the trees so as not to grow crops directly over the roots of the trees. For these crops bone meal and muriate of potash are usually sown in the drills.

In the older orchards the land is generally uncropped, but frequently harrowed. I have seen orchards almost weedless, due to this frequent cultivation. In some cases after the trees are about 12 years old clover is sown and left down for three or four years and mown for hay. This is, however, exhaustive unless some fertilizer is used.

ORCHARD COVER CROPS OR GREEN MANURING.

The object of cover crops or green manuring is to gather and return vegetable matter to the soil, and to protect the ground from the effects of severe frost, especially when unprotected by snow.

For this purpose the orchards are very thoroughly cultivated during the earlier part of the season; and after the close of active growth, about July or August, the surface is shown with some crop which will grow quickly and be large enough to protect the soil during winter.

Crimson clover (*Trifolium incarnatum*) in parts of Canada and the United States, where it stands the winter, is found admirably adapted to supply nitrogenous vegetable matter to orchards at a little cost; it is, however, rather a risky crop in Nova Scotia.

Mammoth clover is found to be the next best, sowing 14 lbs. per acre; tares, lucerne, common red clover, peas, buckwheat, rye and oats are also employed for this purpose. A fair growth will be obtained the same season, which is ploughed in early the following spring, in order not to retard the spring growth of the trees. These crops help to keep down weeds, and where successfully grown enrich the soil at less cost than with farmyard manure. Where clover and other plants of the leguminous family are

grown, nitrogenous manures may be omitted, as these plants have special power to take up nitrogen.

Summer vetch is also excellent and when nitrogen is not important, and weeds (especially couch grass) are to be smothered out, rape and buckwheat are excellent.

SPRAYING FOR FUNGI AND INSECTS.

In Canada both insects and fungi, where they do exist, appeared to me to be more plentiful and more destructive than at Home. Canker in apple trees is, however, very rare. Woolly aphis is not common, and it is said to have come from Europe, and that Europe did not derive it from America.

For horticultural purposes insects may be divided into two classes: (1) Those that chew their food, such as caterpillars, and (2) those that feed by sucking the juices, such as scale insects and aphides.

The chewing insects may be destroyed by distributing poison over those parts of the plant upon which they feed.

In Canada spraying is almost universally practised; useful pumps are manufactured for the purpose, provided with a paddle to agitate the liquid. The pump is usually fitted into a paraffin barrel, the hose pipe is 10 to 15 feet long, often lengthened by a light bamboo tub rod, 6 to 10 feet long, in order to reach high up into the trees. The spraying nozzles are mostly of the Vermorel pattern. In the past year or two a new style of nozzle is being used, in appearance much like a large Vermorel. It has the advantage of being lighter to handle and less likely to catch on the branches of trees as it is being moved about through the top in spraying the interior of the tree. It is also less likely to clog. Several manufacturers have nozzles of of this style on the market, notably the Goulds Company of Seneca Falls, New York; the Friend Company of Gosport, New York; and the Deeming Company of Salem, Ohio. The barrel is mounted on a cart or low wagon ("sloven") and drawn by a horse through the orchard, taking two or three persons to drive, pump and direct the spray. In some cases orchards are sprayed quite early in spring to clean the bark of the trees from scale and moss, using about 6 lbs. caustic rock potash to 50 gallons of water, or this may be applied to the trunks with a vegetable fibre (not hair) limewash brush, either at this time or in June. For spraying with stronger potash solutions, men sometimes wear old mackintoshes, rubber gloves and strap a mackintosh over the horse. This potash spraying is strongly to be recommended.

Powdered caustic potash is sold at most grocery shops in Canada, as it is used for soap making, a 1 lb. tin costing about 5d. These are very convenient for spraying purposes.

Spraying for fungi, Black Spot or Scab on apples (*Fusicladium dendricum*) may be done before the blossom or foliage opens, in order to kill

the spores; for this, copper sulphate alone (2 to 4 lbs. to 50 gallons of water) can be used, without lime, as there is no foliage to burn. The first spraying jointly for insects and fungi is done when the fruit buds begin to unfold, but before the flowers expand, and should cease before the blossoms open. This is to destroy the spores of apple scab fungus and to kill the larvæ of winter and bud moth and apple weevil. The second spraying is given immediately after the petals have fallen; this is specially to destroy codlin moth caterpillar, and if caterpillars are numerous or black spot shows on young fruit or leaf, the spraying should be repeated say once every two or three weeks.

The mixture in common use is the Bordeaux mixture, as the fungicide, Paris green as the insecticide.

To save time, for the former, stock solutions of sulphate of copper and lime are made separately, the Paris green is added direct.

The formula commonly adopted is:—

			For apple.		For plum and peach.
Copper sulphate ...	...	...	4 lbs.	...	3 lbs.
Quicklime ...	...	...	4 lbs.	...	3 lbs.
Water ...	...	...	40 gallons	...	40 gallons
Paris Green ...	...	...	4 czs.	...	3 czs

Copper sulphate is readily soluble in cold water, and still more so in hot. The solution is made by hanging the crystals, contained in a sack or basket, in a barrel of water, near the surface, so that it is just covered by the water. Vessels of wood or earthenware should be used for dissolving the sulphate. Dissolve 1 lb. of copper sulphate per 1 gallon of water for a stock solution: thus, take 40 lbs. for a 40 gallon barrel.

Take one barrel of lime, which should be freshly burnt, place it in a barrel, and pour, say, four gallons of water on it to slake it, afterwards add enough to make it into a creamery mixture like putty, then pour on a little more water to exclude the air and prevent change in character, then cover the mouth of the barrel to prevent evaporation.

For making up a 40-gallon barrelful of the spraying mixture fill the barrel half full with water, then take four gallons of the copper sulphate solution (4 lbs.), dilute with four or five times the quantity of water. Next take some of the lime putty, mix it with water, and add it to the solution, straining it through a funnel-shaped box with a copper wire mesh strainer at bottom. In order not to add an unnecessary amount of lime, thereby risking the clogging of the machinery, it is advisable to test, so as to ascertain whether the sulphuric acid has been neutralised by the lime. For this purpose a solution of ferrocyanide of potassium (half ounce in half-pint of water) is used. Take a spoonful of the mixture from the barrel, in a white saucer or a glass, and add a few drops of the ferrocyanide solution. If a reddish brown colour appears the mixture needs more lime; if there is sufficient lime no discolouration takes place.

Next weigh or measure out about $\frac{1}{2}$ or $\frac{1}{4}$ lb. of Paris green, put it in a cup, and make into a paste with water; add this to the mixture in the barrel.

In Nova Scotia, Paris green is sold at most of the hardware stores in cardboard boxes, containing 1 lb., costing about 9d. It may be tested for its purity by ammonia, which should dissolve it completely, producing a deep blue liquid.

When Paris green is used alone without the Bordeaux mixture it is always advisable to add an equal or double quantity of lime, for the purpose of taking up the soluble arsenic which may exist and might injure the foliage.

To spray twenty-year-old trees, planted forty to the acre, costs for materials 2s. to 4s. per acre per application, and takes about $1\frac{1}{2}$ to 3 gallons per tree to spray thoroughly on both sides. It takes double the quantity to spray when in full leaf that it does before the blossoms open. About four to six applications are generally needed.

Professor L. H. Bailey tells us that with a 300-gallon tank drawn by two horses, with three men, one drawing and pumping, the other two standing on the rear platform two or three feet above the tank directing the spray, each with a hose pipe, the pump having an automatic stirrer; with this rig five acres of full-grown apple trees can be thoroughly sprayed in a day.

For currant and gooseberry caterpillar, white hellebore is used either as powder or if used as a liquid 1 oz. to 3 gallons of water is recommended.

The trunks of old trees are sometimes scraped with a short-handled triangular hoe or box-scraper, to clean off loose bark and moss, the dwelling places of the bark lice, and the winter quarters of the Codlin moth; this is usually done about April.

Insects, the food of which consists only of the sap or juice of the plant, and which thrust their beaks through the epidermis of the plant before they begin to suck in their food, are unharmed by any poison on the outside of the plant. This class of insect, to which scale and aphids belong, can only be destroyed by some substance which is applied to the insect itself, which enters the pores of the body and so kills it.

For apple bark scale (*Mitylaspis pomorum*) the following mixture is used, either in winter or about the middle of June, when the young lice are hatching out:—

Paraffin	...	...	...	...	...	2 gallons
Rain Water	...	...	...	...	...	1 "
Hard Soap	...	...	...	...	...	$\frac{1}{2}$ lb., or
Soft Soap	...	...	...	...	...	1 quart.

The soap and water are boiled together, then paraffin is added. The mixture is well stirred. For use one part of the mixture is added to nine

of water and applied to the bark, either as a spray before the leaf opens or with a brush in summer.

Dr. Fletcher recommends a solution of washing soda, so strong that no more will dissolve in the water, then dilute the soap to the proper consistency.

To counteract mildew on the leaves of gooseberry bushes potassium sulphide, 8 ozs. to 25 gallons of water, is employed.

FRUIT TREE BANDING.

The placing of bands of sticky material to prevent the ascent of the female winter moth, in America called the Canker moth, is practised to some extent in Nova Scotia, though it is generally considered that if spraying is thoroughly done at the right periods, grease banding is not necessary.

The substances chiefly used are bands of tarred roofing paper painted with printer's ink, or castor oil and resin applied direct to the tree. Professor Craig recommended, for winter use, 2 lbs. castor oil to 3 lbs. of resin, warmed together but not boiled, applied warm; and for spring use, 2 lbs. castor oil to 4 lbs. resin. These mixtures are applied after scraping off loose bark, either direct or on the surface of paper. The band is placed about two feet from the ground and about six inches wide, and is put on at the end of October or early in November.

Grease banding seems specially useful in the case of large trees, which it is difficult to spray thoroughly.

APPLE PICKING AND PACKING.

The kind of ladder commonly used for apple picking is one fairly broad at the base, but the sides of which at the upper end terminate in a point. They are liked, as they can be conveniently placed among the branches. The baskets used are of a rounded shape, with swing handle, holding a little more than a peck. These are convenient for emptying the fruit gently into the barrels, in which they are removed from the orchard without sorting. Fallen apples are picked up and sent to Halifax.

The barrels of apples are placed either in a special apple packing house, or more generally in the cellar under the barn or house, ready for sorting and repacking. The apples are sent over to England, chiefly between the end of September and the end of March. For sorting, the apples are poured out of the barrels on to a table, usually about five feet long and three feet wide, with a ledge all round four to five inches high, covered with carpet, felt or sacking. The sorting divides the apples into:

1st, of good size and quality.

2nd, smaller, but of good quality, both shipped to England.

3rd, scrubs, which are sound, but scabbed, ill-formed or otherwise defective, sent to local market.

4th, rotten, for pig.

Sometimes the extra good apples are picked out as specially "Selected."

The Fruit Marks' Act, which has come in force since I was in Canada, provides for four grades:—Fancy, No. 1, No. 2, and No. 3, and defines the size and quality of the first three.

The barrel most commonly used in Nova Scotia is made of fir staves with birch hoops, holding about 120 lbs. fruit and costing 10d. Barrels with staves or maple or elm with elm hoops are used to a lesser extent, but are commonly used in Ontario and the United States. These hold about 150 lbs. of apples and cost 1s.

In packing, the bottom and bilge hoops are first nailed, then a thin layer of wood wool called "Excelsior" is placed at the bottom, next a sheet of white paper the same size as the end of the barrel. A layer of "headers" is then laid; these are apples of average size, those best coloured being chosen. These are placed stem downwards. The barrel is then filled by carefully emptying in the fruit, using hinge-handled baskets. The barrel is gently shaken each time the fruit is added, so as to pack the fruit closely. It is filled one to two inches above the rim. In order to get the apples tightly packed so that they do not move after packing and become "slack" in travelling, a round board lined with sacking or saddler's felt is placed, padded side downwards, on the top of the apples; the barrel is rocked on the floor if of cement, or if not, on a heavy plank. The apples thus shaken and pressed sink to about the level of the rim; any spaces are filled with small apples, then another piece of white paper is placed on the apples, the chine hoops are knocked up to loosen them, to allow the lid to enter the mouth of the barrel, then the lid is laid on, and the screw or lever press is applied to the barrel to press the lid into position; followed by the tightening of the chine hoops and nailing of the head and hoops.

The name of the apple, together with the owner's name and address, are stencilled on the top of the barrel; the name of the salesman on the bottom.

The cost of sending over to England—London or Liverpool—from the Annapolis Valley, *via* Halifax, is about:—

Rail ...	...	...	(60 miles)	...	...	1s. 3d.
Steamer	...	...	(2,450 miles)	...	...	2s. 6d.
						<hr/> 3s. 9d. per barrel

The salesman's commission in London is usually five per cent.

Notes on Fruit Preserving.

By A. E. DIXON.

How to Keep Fruit.—The French are great on fruit experiments, and they have been trying through Max de Nansouty how to keep fruit. The best test was to wrap in silk paper and bury in dry sand. The fruit were fresh in appearance, with natural odour and flavour, after six months' keeping. In stubble and straw fruit rots very quickly, while in shavings it mildews, and dry sand has proved the best preserver.

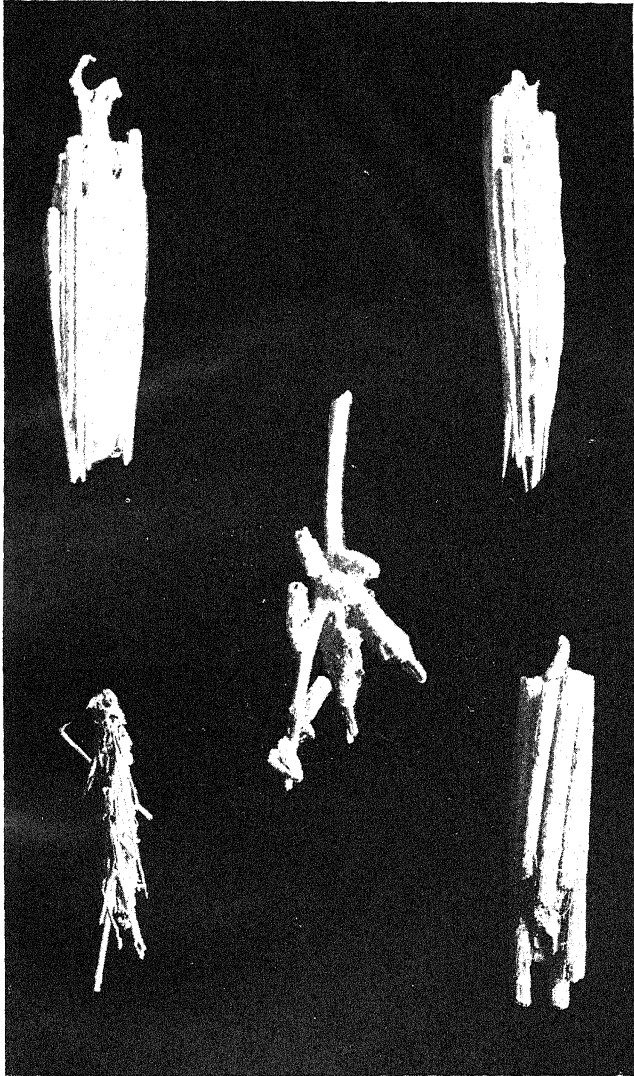
Powdered Cork as a Preservative.—Tests have been shown that powdered cork acts well for packing fruit. A bed of cork is placed at the bottom of the case, and the fruit and cork are disposed in alternate layers, with cork on the top. Care should be taken to well fill in the open spaces to prevent friction. Fruit has thus been kept for a year, and when unpacking for sale plunge the fruit into water to freshen the appearance. 50 lbs. of cork goes to 1,200 lbs. of fruit. The cork serves to keep the fruit sound against cold, heat and humidity. Grapes, mandarines, tomatoes are often packed in this way.

Crushed Fruit Preserving.—Add to each pound of fruit one pound of sugar. Place on fire and bring to a boiling point, stirring constantly. Just before removing add to each gallon of pulp one ounce of saturated alcoholic solution of salicylic acid. Put into air-tight jars until wanted.

The number of bushels of shelled grain in a given lot of husked mealies may be calculated if the following procedure be adopted:—Two cubic feet of ground, sound, dry maize will make a bushel of shelled grain. Therefore to find how much grain is contained in a barnful of husked maize find the cubic contents of the barn and divide by two for the number of bushels of shelled grain. Suppose the barn to be 30 feet long, 12 feet wide and 8 feet high and packed with husk maize. $30 \times 12 \times 8$ equals 2,880 cubic feet. Divide by two, and you get 1,440, which will represent the number of bushels of shelled grain in the barn.

Thorn Basketworm,

Thorn Basketworm,



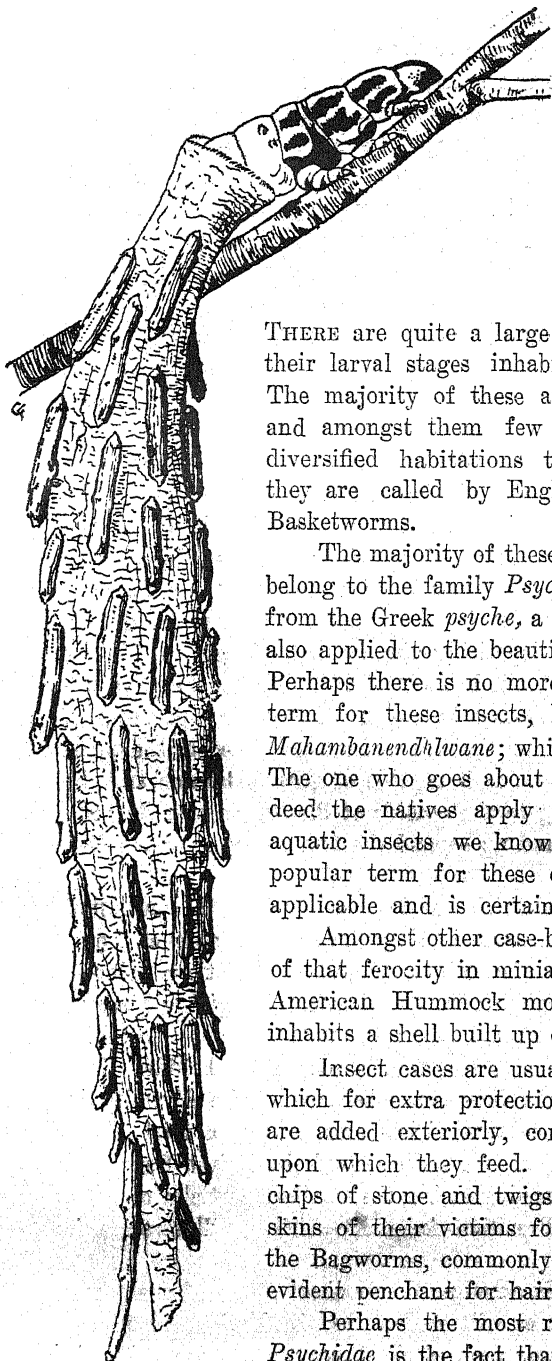
Wandering Bagworm.

The Lictor's Bagworm.

PRIVET BAGWORMS.

Some . . . Common . . . Bagworms and Basketworms.

By CLAUDE FULLER.



THERE are quite a large number of insects which in their larval stages inhabit small portable domiciles. The majority of these are the caterpillars of moths, and amongst them few have more interesting and diversified habitations than the Bagworms, or, as they are called by English and American writers, Basketworms.

The majority of these insects which one meets with belong to the family *Psychidae*, which derives its name from the Greek *psyche*, a butterfly; a name the ancients also applied to the beautiful maiden beloved of Cupid. Perhaps there is no more expressive nor descriptive a term for these insects, however, than the Zulu's *u-Mahambanendhlwane*; which, being interpreted, means: The one who goes about in his little house. True indeed the natives apply the word equally to those aquatic insects we know as Caddisworms; but, as a popular term for these creatures, it is none the less applicable and is certainly more significant.

Amongst other case-bearers, mention may be made of that ferocity in miniature, the aphid lion, and the American Hummock moth, the caterpillar of which inhabits a shell built up of its own excreta.

Insect cases are usually composed of spun silk to which for extra protection particles of foreign matter are added exteriorly, commonly parts of the plants upon which they feed. The Caddisworms use small chips of stone and twigs and the aphid lions the dry skins of their victims for this purpose, whilst one of the Bagworms, commonly found in Maritzburg, has an evident penchant for hairs.

Perhaps the most remarkable feature about the *Psychidae* is the fact that the adult males are winged

whilst the female, at maturity, is a most degenerate creature, no more in fact than an animated bagful of eggs.

It is very curious, in studying the development of these insects, to see the parallel growth of the two sexes, to a point alike in all essential respects, ultimate in climax and anti-climax. The two caterpillars, structurally alike, grow steadily through the better part of a year to full size: both pupate—one to emerge with complicated and wonderfully improved anatomy, able to fly, with eyes, feelers, legs, antennæ and body clothed in velvet pile—the other to degenerate into a more or less naked maggot, blind, mouthless and footless, lacking even that degree of specialization it possessed in its earlier form.

There is scarcely a phase in the development of these insects which is not of some peculiar interest, so that, to avoid too much generalization, as full an account as possible is given later of the more prominent amongst our local species, the Wattle Bagworm.

Although all are most degenerate, the females of one species may not be so lowly as another—thus it will be seen later that this sex in the Wattle Bagworm is at maturity in truth but a worm, but in others the female, whilst being degenerate and lacking wings, possesses legs and is able to leave the bag. The male insects of course visit the females, and, in such cases as the last mentioned, copulation occurs outside the bag, the female subsequently depositing the fecundated eggs within its recesses and dropping to the ground dead. Where the female is vermiform, of course, she cannot leave the bag to meet her spouse, and, furthermore, she so lies in the bag that her head is presented to the opening. Now the abdomen of the male is capable of great extension and the creature is able, whilst clinging to the outside of the bag to pass its body in through the lower opening and up beyond the female and so accomplish the grand object of Nature.

A further curious feature which has been ascertained in connection with the *Psychidae* is the occurrence in certain species of asexual reproduction. In other words, for a certain number of generations colonies of these particular species comprise only agamic creatures giving birth to progeny of the same character without the influence of the male insect: a condition of affairs more commonly met with amongst the Aphides.

Bagworms as a subject are interesting because of the diversity in the ornamentation of their structures. They also present a fairly large range of sizes from the small, simple structure of the Privet Bagworm, half an inch long and ornamented with but the smallest particles of bark, to the huge Australian and Brazilian form of which an illustration is given on the preceding page.

The building of the bag is amongst the earliest efforts of the newly hatched larva. It commences, as will be described in detail later, in the form of a silken collar about the neck of the infant caterpillar. This is

added to from the front, the silk being spun, as in the case of the Silkworm, from the insect's mouth, and, as it is added to, it is pushed backwards over the body.

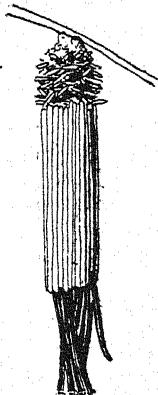
The portions of leaves and twigs which give the bags their characteristic and widely divergent appearances are applied as the structure of the bag proceeds, and, in many cases, the caterpillar has to project most of the body to apply the finishing touches.

THE PRIVET BAGWORM, to which mention has just been made, is a small, simple form taken upon privet hedges in Maritzburg. The moth is a very small creature with grey wings. The native host plant of this insect is unknown. The bag is grey or brown in colour, and interesting because as a rule a ridiculous little twig is stuck on near the extremity to represent a tail.

GIBSON'S WATTLE BAGWORM, observed by Mr. Gibson, the Resident Magistrate at Mahlabatini, where the species has been taken upon the cultivated wattle and gives promise of becoming a pest, is peculiar and interesting because of the thread-like neck by which the caterpillars suspend the bag when about to hybernate. Otherwise the bag is of simple structure.



The Wandering Bagworm.

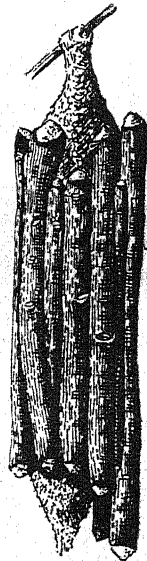


The Webbed Basketworm, early stage.

THE WANDERING BAGWORM is a creature of solitary habits met with in all sorts of extraordinary places. Presumably it feeds upon grass, in view of the fact that it is seldom found without several haulms attached to its bag, its wandering habit is perhaps due to its specializing in this direction.

THE LICTOR'S BAGWORM is not a common creature although this form of bag is met with in several countries. It is so designated because the bag is completely protected by a palisade of uniformly cut twigs so arranged that the bag resembles the fæces of the ancient Roman Lictor.

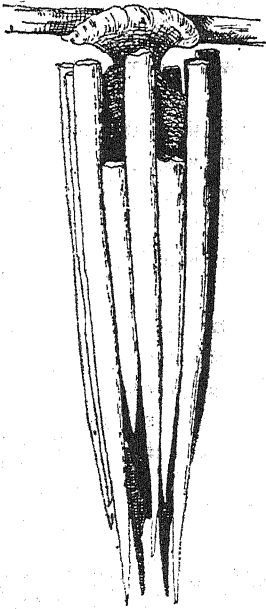
THE WEBBED BASKETWORM constructs a domicile of somewhat hexagonal form by placing short lengths of grass haulms transversely around the bag and so giving it a marked resemblance to a small basket. When young it feeds upon grasses, but later affects shrubs, and has been taken upon the grape, plum and apricot. When



The Lictor's Bagworm.

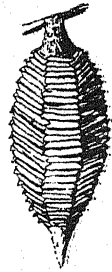
this stage the bag being fully designed for its purpose, the caterpillar spins a web all over the exterior, forming a strong coat of grey silk.

THE THORN BASKETWORM is perhaps the largest species found in Natal, and it forms a particularly handsome basket from the large white thorns of its host, which are arranged as a neat encircling palisade about the outside of the bag. The earlier stages of this insect have not been observed so that one cannot speculate upon the construction of the completed bag with any degree of certainty, but from appearances the caterpillar must at some time of its growth reconstruct its premises on a large scale and no doubt is compelled to get outside the bag to place the component parts of the palisade with that precision and nicety in which they appear finally.



The Thorn Basketworm.

THE U-MAHAMBANENDHLWANE is a small form commonly found in the grass with its basket constructed of evenly-cut grass haulms upon similar principles to the Lictor's Bagworm. It would appear that this insect super-



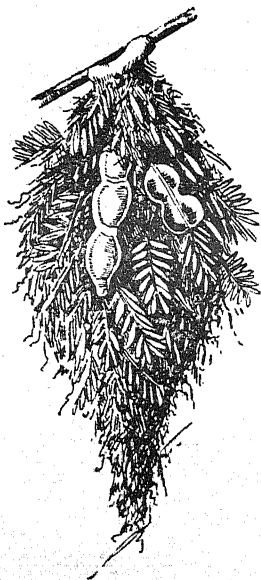
The u-Mahambanendhlwane.

imposes one edifice upon another, the tail part of the basket resembling the upper, except in point of size and freshness of the material of which it is constructed. The Native cognomen has been applied to this form because it is the species usually referred to. Curiously enough, it is believed that if cattle eat these bagworms they are poisoned and die foaming at the mouth. Of this the Natives of Natal, Zululand and the Transvaal are fully convinced, and like some other Native superstitions it is well rooted in the minds of many farmers. There is no evidence to support the contention, and what experiments have been made show that the insects had no such ill-effect.

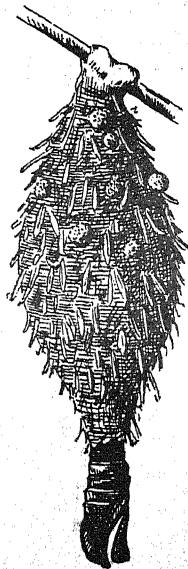
THE WATTLE BAGWORM.

Since the publication of the writer's first report, in which the original account of the natural history of the Wattle Bagworm was given, the wattle industry has assumed an importance practically speaking second to none in the Colony. Further, it is an industry of which each new year sees some greater development. To the local grower, with his trees free from the one hundred and one insects which feed upon wattles in their native habitat, Australia, the Bagworm,—until he grows ac-

customed to it,—appears a considerable menace to this industry. However, as a pest, it is no worse to-day than it was twelve years ago; and if occasionally it does assume alarming proportions, it never becomes absolutely ruinous. Perhaps one year it is more prevalent than another, or perchance it does some havoc in a young plantation, but, in no way does it threaten nor impede the steady and forward development of the industry.



Female.



Male.

The Wattle Bagworm, male and female bags.

Like to the foregoing species, this is a South African insect and its original and natural host plant is the Thorn tree. It is a well-known fact that, in their natural environment, insects seldom become injuriously predominant. This is, of course, not always the case, as, for example, the Colorado Beetle in America and the Mealie Grub in South Africa, but it holds good in a general way throughout the Insect World.

The mealie-grub has become an injurious factor, first, because of a superabundance of food supplies, and, secondly, because the local culture of the mealie does not interfere with that course of events which would occur were the plant growing in a state of Nature. The original hosts of the mealie-grub were of African origin, and most probably imphe (sorghum) and amabele (Kafir corn).

In a wild state these plants would be eaten down too much to be plentiful, so the increase of the insect would be limited by food supplies; further, of course, the plants would be scattered and not growing by the

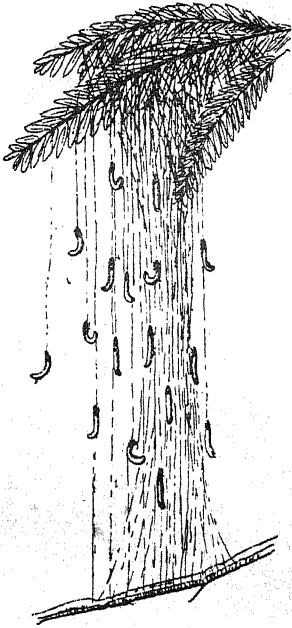
acre. Again, the stalks and roots would remain in the soil and provide winter quarters for the hybernating caterpillars. It is here that by leaving the mealie stalks in the lands throughout the winter the grower leaves matters in as natural a state as possible. The mealie-grub, therefore, has become a pest primarily because an abundance of food supplies permits a numerical increase which Nature never contemplated, and further because more nourishing food tends towards a greater issue; secondarily, the system of cultivation provides for the hybernation of the grubs in excess of their requirements so that a far greater number live over from season to season than could occur in a state of Nature. Nowadays, it is practically beyond the influence of its natural checks as not only has it found in the new host a more nourishing food plant but one which provides it with a greater degree of protection from frost, parasites and other unpromising contingencies of its dormant period.

The adoption of the wattle by the Bagworm provides a somewhat, but not wholly, parallel case. Food supplies are more abundant and trees are closer together, but no greater degree of artificial protection from natural drawbacks is enjoyed. Consequently, as the Bagworm increases numerically, so its increase is more or less set off by the reaction of Nature's checks and the increase of parasitic and predatory enemies.

Later, in discussing the details of the development of this insect, there will be mentioned a remarkable habit displayed by the newly hatched caterpillars which can only have for its objective the more thorough dispersal of the species. It will be shown that as a result of this habit the only means the insect has of ensuring its distribution is of a passive nature and entirely due to accidental transportation by some other active agent. Where the power or instinct to migrate is lost, its place is not unusually supplied by the instinct to secure transportation by exceptional means, as in the case of the Bagworm. We see something of this in studying ticks. These creatures have but little migratory instinct and do not, as one might reasonably suppose, prowl about in search of hosts; but they have exceptionally developed the instinct to catch on to every moving object brushing against them, and further they have the extra provision of being able to live without food for extensive periods—about six months in the case of ordinary ticks and several years in the case of fowl ticks.

Further, whenever the continuance of a species is so left to chance, Nature provides for adverse circumstances by giving to these her creatures great powers of reproduction. Thus such small animals as ticks produce from two to twenty thousand young, whilst the Bagworm lays about 1,600 eggs. It is most obvious that there is a ruthless disregard for life in Nature's ways. For example, 300 Bagworms amongst an acre of wattle trees would to the practical mind mean nothing. If only 100 of these were females, however, their grandchildren when full-sized would, on a

most reasonable estimate, when laid out upon the ground cover 12 acres of land. Instead, however, of there being a few hundred to the acre there are always thousands, and but a very small proportion of their progeny indeed come to maturity. The life of a Bagworm is one series of disasters: the bulk are destroyed almost as soon as they are born; of what are left the majority die or are destroyed before they have designed a full-sized domicile; and of the full-sized bags, as a rule, only 18 to 20 per cent. contain living insects.



Young Bagworms disporting on silken ladder just after hatching from eggs.

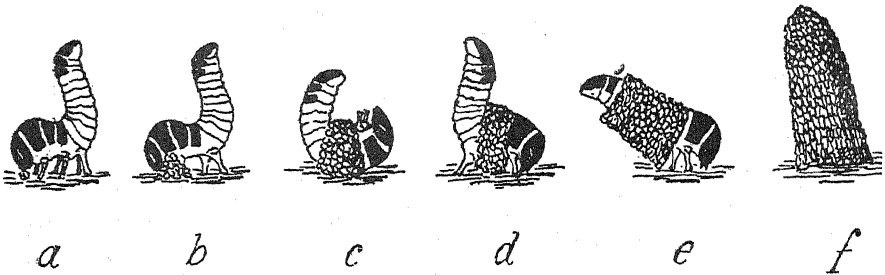
The following is a brief summary of the natural history of the Wattle Bagworm from original investigations. The young caterpillars hatch and leave the maternal bag about the second or third week of September (this occurs a few weeks earlier on the coast). In this stage they are tiny, black caterpillars only about one twenty-fourth of an inch in length. Upon emerging from the bag they display unusual activity, but do not commence feeding immediately. For several days they seem content to play about, suspending themselves in mid-air by silken strands like spiders. Should they by chance come in contact with some adjacent object, they strengthen up the silken span thus formed and use it as a ladder, up and down which they travel in a purposeless manner. Often a great colony of young worms may be observed on a wide ladder between two branches, the strands being as much as 30 inches and more in length. This peculiar feature is actually the insects' effort to-

wards dispersion, and it is because of it alone that Bagworms are brought to a new plantation either from the native bushes or other wattles.

These silken threads, on which the new-born caterpillars disport themselves, are glutinous and easily broken, so that they cling readily to any passing object breaking through them. So it is easy to conceive some bird or insect carrying off a score or more of the young caterpillars still struggling on the broken strands. The feasibility of this has often been demonstrated by breaking through the strands with a stick, and larvæ have been so transported for a mile or more.

Under ordinary circumstances, either when tired of freedom or with the development of appetite, those caterpillars which have escaped an untimely end and find themselves favourably located, settle down to the

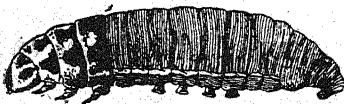
construction of their infantile cases which, upon completion, are more or less replicas of that from which they themselves have not long emerged.



Young Bagworm constructing its bag.

The first thing the young caterpillar does is to encircle its neck—or rather the region one may so designate—with a narrow silken collar. The first part of the operation consists in gnawing off little fragments of the leaf surface, which are fastened up with freshly spun silk. In 20 or 30 minutes a narrow strap is completed, and this is fastened down with silk at each end to the leaf surface. After a detailed inspection it now places itself astraddle of its work, and, bending the head down, dives underneath, so that it turns a somersault and for a moment lies upon its back strapped down “under the chin” to the leaf. Presently it turns over on to its feet again so that the strap lies over the back of the body. Work now recommences and soon a small narrow collar encircles the neck. From now onwards the structure of the bag is simple for the width of the collar is gradually increased by adding silk and fragments to the anterior margin, and as it grows in depth it is worked back further and further over the body so that in the course of three or four hours the little creature is completely encased. Three or four hours more are given to the finishing touches and the strengthening up of the fabric with an inner lining of silk. When finished to the entire satisfaction of the maker—and if one observes them carefully for the six or seven hours the whole operation takes one is greatly impressed with the creature’s fastidiousness—off it marches on life’s journey, for good or ill, with its back cocked upright over its head with the perfect self-assurance of many of God’s small creatures.

As the caterpillar grows, so from time to time when occasion demands the size of the bag is increased by additions to the anterior margin. Quite a month passes before sufficient growth is made to need a bag more than



Fully-grown caterpillar, female.

half-an-inch in length, and for another month this is scarcely increased in size. At the end of two months alterations and improvements are effected in the appearance of these habitations—much

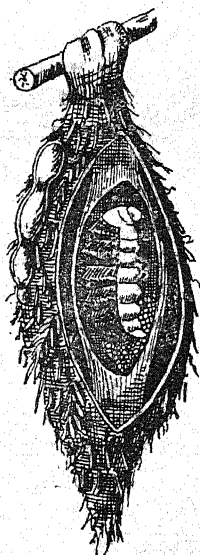
PLATE B.



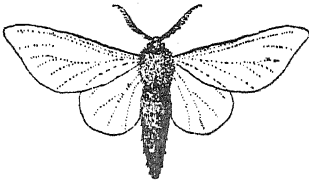
GIBSON'S WATTLE BAGWORMS FEEDING.

longer pieces of leaf are now cut off and attached to the exterior, together with bits of twigs and seed-pods. These additional ornaments make the bags look very much larger. They are not, however, completed for another month. After the middle of January, although the worms feed as much as ever, the bags are not further enlarged. Feeding continues until the cold weather sets in about May, when the bags are webbed tightly to the twigs and the mouth closed. In webbing the bags up the twigs are usually encircled with a strong band of silk, and as a consequence when the spring flush starts twigs often become constricted and break in the wind at these points. An examination of the bags at this time will show some much plumper than others, and the caterpillars in the bigger bags are proportionately bigger than those in the smaller. The former are females, the latter males. Having reached this stage the male caterpillars, turning the head towards the lower opening of the bag, at once transform into pupæ; the female caterpillars, on the other hand, hybernate without changing their form, and it is not until late in July or early in August that the change into the pupa stage occurs. In the case of the females the pupa stage lasts for two or three weeks. Shortly after the females transform the adult male moths emerge from the bags. Preparatory to emergence the chrysalis wriggles itself half out of the opening and so the male is not impeded by the bag in any way in its final and most hazardous change of form. At this stage in some districts the males are eagerly sought for by little insectivorous birds—the little “silver eye” of the Thorns—and nothing is more interesting than to watch these little feathered things closely scrutinising and examining one bag after another alert to capture an emerging male or expectant female.

If, during August, the bags are opened and examined it will be seen that, before entering the pupa stage, the caterpillars have spun cocoons of silken texture within the bag, and within these inner cocoons the eggs are deposited by the females. These measure three-hundredths of an inch across, and some 1,600 are deposited by a single female. The larvæ, when full-grown, measure from $\frac{3}{4}$ inch to 1 inch in length. The body is of dark brown colour, except the head and three thoracic segments, the former being mottled with red, and the thoracic segments with three broad, longitudinal bands of a dull, white colour. The chrysalis of the male is of a dark red-brown or almost black colour, about three-fifths of an inch in length, and is of normal appearance.



Section of bag showing adult and degenerate female.—
Diagrammatic.



Male Moth of the Bagworm.

The adult male is a small brownish moth, with transparent, wasp-like wings. The body, which measures a little over $\frac{1}{2}$ inch, is clothed, as if with velvet, by many hair-like scales. Across the expanded wings the measurement is about one and one-fifth inches. The abdomen is capable of much extension. The chrysalis of the female is stout, conspicuously segmented, of a reddish-brown colour and about seven-tenths of an inch in length and three-tenths in width. The head of the caterpillar is rudely indicated and the posterior is pointed and furnished with a small orifice.

The adult female is a maggot-like creature. The region of the head and thorax is brown, and of a corneous nature, terminating in two points, all the organs, such as legs, mouth parts are aborted. The six true legs are represented by small, conical papillæ, the largest being those on the first thoracic segment. The first thoracic segment is furnished with a pair of lateral protuberances, the apices of which are truncate. The abdominal segments are clothed with a downy hair, and the last ends in a tubular sexual organ, which it is possible the insect passes through the opening in the pupa-shell to cohabit with the male.

Other than upon acacias and mimosas, these Bagworms are seldom found feeding; they will, however, be occasionally met with upon apple trees and oaks, particularly when growing in the vicinity of wattles. In such cases, of course, the appearance of the bag is considerably modified by the portions of leaves of oak and apple used in its decoration.

Comparatively speaking, few Bagworms reach maturity. From my observations of two seasons it appeared that about only 18 per cent. of the full-sized bags found in a plantation contained full-grown insects. The females produced are more numerous than males, but at maturity there is a fairly even number of both sexes alive. Calculating roughly, from every 100 bags upon the trees only 14,400 eggs are produced, *i.e.*, 1,600 eggs for nine bags only, 9 per cent. of adult females being left. This is small compared with a possible 120,000 should the 75 per cent. of females come to maturity. The destruction of 82 per cent. of the Bagworms during the last stages of their growth (for no notice has been taken of the deaths in the earlier stages), is due to several causes. The larger number succumb to parasitic fungi, others to ichneumon and dipterous flies. Occasionally, too, another enemy, at present unknown, plays a most im-



A Bagworm which has fed upon Apple foliage.

portant role in destroying these insects. This is not the work of the small bird to which allusion has already been made. What this enemy is I am unable to say, but it secures the Bagworm intact, tearing or cutting a neat circular hole in the side of the bag just large enough to extricate the worm.

Speaking of newly-hatched worms, I feel certain that a great number never reach the first bag-making stage, falling victims to many untoward circumstances during the time which elapses between emerging from the maternal bag and when they commence to furnish a home for themselves.

TREATMENT

In the case of attack upon a few trees, spraying with Paris green or arsenate of lead and water, or hand-picking, should control the pest. Where a large plantation of grown trees is affected, however, I fear that the profits upon wattle-growing are not sufficient to warrant treatment of this sort, if indeed any, unless, of course, its existence is threatened. This is, considering the number of natural enemies from which the Bagworm suffers, even in seasons favourable to its increase, hardly to be expected. Should the pest appear in large numbers in young plantations, where the trees are well within reach, a profitable plan to adopt would be to hand-pick thoroughly and burn the bags collected, or else spray with arsenate of lead.

Irrigation reclaims arid wastes; makes a prosperous country; causes the desert to blossom and overcomes the destructive effects of the parching southern winds; insures full crops every season; improves land at each submergence, and consequently does not wear out the soil; produces support for dense population; multiplies the productive capacity of soils; destroys insects and worms and produces perfect fruit; creates wealth from water, sunshine and soil; makes the farmer independent of the rainfall; . . . makes the production of the choicest fruits possible, and prolongs the harvest period of various crops if so desired; affords a sure foundation for the creation of wealth; lessens the danger of floods; utilises the virgin soil of the mountain regions; . . . insures two or more crops annually in the low altitudes; will increase three-fold the value of lands having rainfall; keeps off the early approach of Jack Frost; improves the quality and increases fully one-eighth and sometimes one-fourth the size of fruits, vegetables and grains; makes farming profitable in waste places and forever forestalls the inroads caused by the ghost of drought; and will finally solve the great labour question and fortify against the alarming increase of city populations.—*Lute Wilcox ("Irrigation Farming")*.

Maize for the Manufacture of Alcohol.

A POSSIBLE INDUSTRY FOR NATAL.

THE manufacture of industrial alcohol upon a large scale is one of Natal's coming industries. For years past methylated spirit has been turned out in some quantity on our sugar estates, but its manufacture has never assumed any very great degree of importance. Articles on the subject, as well as on the use of alcohol in automobiles of all kinds, to take the place of gasoline, etc., for illumination purposes, have appeared from time to time in these pages, and the possibilities before the industry have repeatedly been pointed out.

Little, however, has been said regarding the manufacture of denatured alcohol from mealies, although this grain forms one of our staple crops. Here, surely, is an opening for our surplus mealies that are too poor to export, and here would be provided a fresh opening for mealies that would furnish another stimulus to the cultivation of this important grain.

In America, the great mealie-country of the world, commercial alcohol is made on a large scale from mealies, rye, barley and other grains; and one of the most striking stories of the use of this article from the experimental stage to its commercial use is told in an interesting article which appeared recently in *Harper's Weekly*. Illinois is one of the great mealie-growing States, turning out over 115,000,000 muids of mealies a year—and the visitor can believe it as he travels through the endless monotony of mealie fields. Every little railway station—and no matter how little—has its platform for loading mealies into the cars on the sidings, and long rows of cribs to receive the maize contribution of local farmers to await shipping facilities.

Maize is everywhere and everything. It is food, clothing and rent. It is to Illinois what steel and coal and iron are to Pennsylvania, what rice is to South Carolina, what tobacco is to Kentucky and cotton to the Gulf States.

And as you go on westward the picture does not change. In Iowa the mealie crop amounts to three hundred and seventy-three million and odd bushels; in Missouri it is two millions and a quarter; and in Nebraska a little more, with other States turning in their additional millions to the common hopper.

This maize when harvested goes many ways. St. Louis grinds a lot of it. Iowa feeds it to the hogs, and ships it to Chicago and the East in that form. As a matter of fact, there are more muids of mealies fed in Iowa than are grown there, but a vast quantity of mealie pro-

ducts of other States finds its way into Illinois, and is ground up in the giant distilleries of Peoria.

Maize explains Peoria, in a way. The town lies on the banks of the Illinois river, in the midst of what is declared, and rightly, to be in summer-time one of the hottest sections in the United States. Peoria was there when folks travelled by stage and water, and to this day is not touched by the main line of any railroad. The Rock Island and the Alton put in branches there, and over these millions upon millions of bushels of mealies and a mass of other grains, principally rye and barley, are trundled into Peoria. It is the distilleries, seventeen all told, that have made Peoria famous. It is the centre of spirit manufacture, for it is, or has been until the last few years, the very heart and geographical middle of the mealie belt, and the other grains are not so far distant as to involve an excessive haul. This is the economy of manufacture, to be near the raw materials.

One of the biggest and most thoroughly equipped of the great distilling establishments of Peoria was the Atlas—a sky-scraping collection of brick buildings in the outskirts of the town, with a row of mighty steel stacks towering up into the sky.

When the knowledge of what Germany and the other European countries were doing with denatured alcohol began to be disseminated in this country, when its big utility for purposes of heating, lighting, motive power and commercial manufacture were made known, the Atlas Distillery stopped making whisky. The last gallon of the national stimulant was shipped out from its doors some three years ago, and to-day, instead of contributing its thousands upon thousands of barrels of strong drink, its mills are grinding grain, its cookers and vats and stills are seething with the processes that go to the making of denatured alcohol.

The Atlas has ceased to be a drink-maker, and is helping to turn wheels and heat houses by the new cheap agent and assisting the cunning works of commerce and the arts.

Last year the establishment used something over three million bushels of mealies, rye and barley, and the long trains, grain-laden, drawn in by the railroads from various sections of the farming country, are taken over its sidings and up to the unloading sheds at the side of one of the tall buildings.

From the car doors it is shot down through a grating at the side of the track under the long shed. Underneath this is a hopper from which the flying carriers, whisking up and down on their swiftly-moving belting, take it up into the big storage receptacles high in the roof.

Thence it is delivered as needed to the groaning mills, and all the air is resonant through the long days with the sound of the grinding. When ground it is transferred to the "cookers" in an adjoining room,

vast metal receptacles that themselves look like big boilers. Here in the shape of mash the grain lies for an hour, and then is forced by vacuum pressure into a vat, where a revolving beam keeps it constantly agitated and through which with only brief delay it is pumped into the fermenting tubs.

These are gigantic wooden affairs, with their tops away up in the shadows under the roof. Here the grains lie for seventy-two hours. Underneath the iron-grated floor of the gloomy house where these tubs are crowded together there is a huge cistern, into which the mash drops from the tubs. From this cistern, after a short period of retention, it is pumped into a beer-still. At this stage of progress the mass is known to the distilleryman as "beer."

While it lay in the fermenting-tubs the yeast was introduced, so that now, when it reaches the beer-still, it is in a lively state of fermentation and vapors are thrown off, which are the first material results of the changes it has undergone. Inside of the still when these vapors rise to the top they are condensed into high wines, which are drawn off, while the mash, with its remaining moisture after all the high wines have been collected, is carried away to the feed-house.

Now that Nature's mysterious work of chemical extraction has been perfected, modern ingenuity takes the grains in hand to see what can be made of them. Here is where science achieves her finest triumphs and becomes the true servant, for it is in the saving of every atom of waste, the conversion to profit of things already used and which former ages considered of no worth, that latter-day manufactures makes its surest margin of gain. Millions have thus been added to the wealth of the world in the past decade.

When the mash, now known as "slop," heavily saturated with moisture, is first taken to the feed-house it is subjected to heavy pressure and all possible liquid squeezed out of it. The residuum of the grain is then dried by being run through heated chambers and over spiral evaporators and packed as feed for cattle.

There still remains, however, the liquid, and this upon examination was found to be high in nutritive elements. After sundry experiments a mechanical method was obtained of converting this into solid form, and now it comes out from the final stage of reduction in the shape of a thin, breadstuffy brown sheet which when it first leaves the compressing-rollers has the appearance of crepe paper. Added to the dried-out grains before mentioned, about four pounds to the bushel, there results a nutritious cattle feed, which wet down with mealie stalks and other solid fodder is one of the most effective of milk-producers, showing as high as thirty-three per cent. of proteids, fourteen per cent. of fats, forty per cent. of carbohydrates, and from twelve to fourteen per cent. of fibre. This utilisation of the fluid residuum adds about one cent. a

pound to the value of the feed. Thus the last elements of worth in the grain are saved, and preserved in this way go back through the medium of manure to the land to make more mealies.

This is a digression, in a way, but meantime the work of making denatured alcohol goes on without interruption. The high wines which were solidified from the vapors thrown off from the mash in the beer-vat are again vaporised by means of steam coils and redistilled in a similar fashion, after which they come out in the shape of alcohol.

It is at this stage that the real making of denatured alcohol for these several chemical and manufacturing processes begin. The pure grain alcohol is carried over in long pipes from the distillery to the denaturing bonded warehouse in another part of the great plant and stored in an immense tank.

All along one side of the place are huge, white-painted wooden tanks, and at the head of the line a weighing-tank with scales attached, into which the pure alcohol is drawn for measurement, and where wood-alcohol and benzine are added before the denaturing process begins. Pipes lead to each of the denaturing tanks, one tank being reserved for each of the formulas at present prescribed by the Government.

Uncle Sam keeps scrupulous watch of the manufacture to see that no pure alcohol escapes to any quarter without paying its due portion of tax, and that all is used in the denaturing processes which render it, nominally at least, undrinkable.

What is known as the "complete" denature is made up of ten gallons of wood-alcohol to one hundred gallons of grain alcohol and the further addition of one-half gallon of benzine. This is the mixture as it is weighed in the weighing-tank and cast off thence into the other tanks where special formulas are prepared. Off at one side of the warehouse is a room in which are stored all the materials used in the different commercial denatures. Here are benzol, bezine, ether, camphor, pitro-naphtha, caustic soda, castor-oil, oil of nicotine, ammonium iodide, sulphuric acid, pyridine, cadmium iodide, and a multitude more which are kept under lock and key and accounted for by the store-keeper, and which are added in prescribed quantities in the various tanks to the "complete."

When these denatures are finished the barrels are rolled up and filled from the tanks, and the gaugers keep record of it all. To distinguish the denatured alcohol in shipment from the ordinary alcoholic products, green-painted barrels are used to contain it, and for the shipments to the great chemical manufacturing houses of the East steel drums are employed.

The Position of East Coast Fever.

LISTS OF OUTBREAKS DURING JANUARY AND FEBRUARY.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st January to 20th February:—

Dundee District.—Outbreaks on farms “Diervlakte” (north of Vryheid line), “Gowrie” (east of main line), “Evansdale” (east of main line).

Umvoti District.—Outbreaks on farms “Middieton,” “Good Hope,” “Uitzicht.”

Utrecht District.—Outbreak on farm “Groot Vallei.”

City Division.—Outbreaks on farms “New Scotland” (cattle of Indian), “Camp Drift” (cattle of Indian).

Umgeni Division.—“Plessis Laager,” “Littleton” (this farm is in that portion of Umgeni Division which, for East Coast Fever, is considered in the Magisterial Division of Richmond).

Lion’s River.—Outbreaks on farms “Ellerslie,” “Shawswood,” J. M. Buchanan’s portion of “Stocklands.”

Camperdown.—Outbreaks on farms “Sterkspruit,” A. Newland’s portion of “Valsch River.”

Weenen County.—Outbreak on farm “Kelvin Grove.”

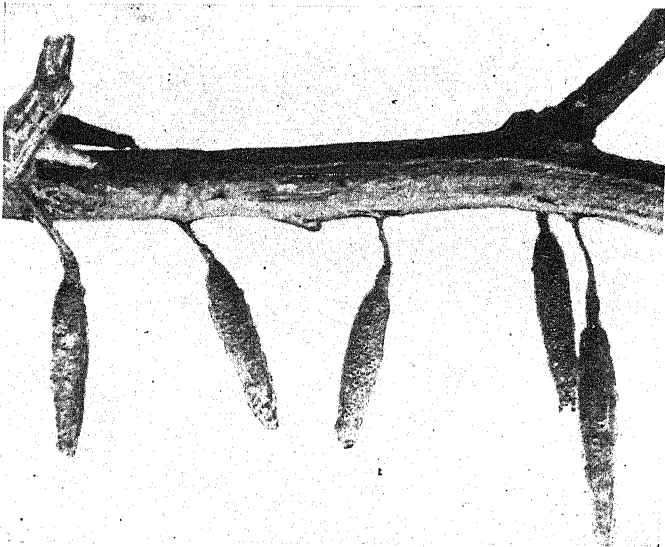
No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of Victoria County, Vryheid, Babanango, Ngotshe, Paulpietersburg.

A SIMPLE TEST FOR LIME IN A SOIL.—Take a few shovelfuls of soil from different parts of the field or orchard and dry, pulverise, and mix them thoroughly together. Take a few ounces of this, powder, and reduce to ashes on an iron shovel over a fire. Put these ashes when cool into a glass tumbler and mix with them as much water as it will take to cover them. Stir this with a glass rod or wooden stick, but not with anything metallic. To this paste add an ounce of hydrochloric acid, which is commonly sold as muiratic acid, or spirits of salts, the mixture being stirred all the time. If a fairly brisk effervescence takes place, it may be taken for granted that the soil contains a fair percentage of lime, but if little or no effervescence takes place the soil contains little or no lime.—Bulletin No 6, Department of Agriculture, Tasmania.

PLATE C.



GIBSON'S WATTLE BAGWORM (*Enlarged*).



GROUP OF GIBSON'S WATTLE BAGWORMS HYBERNATING.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

KRANTZKOP.

THE Krantzkop Farmers' Association held their annual general meeting on the 23rd January, with the president (Mr. M. Landsberg) in the chair. There were present, among others, Messrs. C. J. van Rooyen (L's son), P. J. Nel, J. T. Martens (D. J.'s son), A. W. Ambler, J. P. Nel, W. F. Nuss, P. J. Nel, L. M. J. van Rooyen, jun., G. T. Van Rooyen, J. F. Clark, L. J. Nel (L's son), F. E. van Rooyen, J. H. van Rooyen, P. R. Vermaak, L. M. J. van Rooyen (Scottsdale), L. M. van Rooyen (J.'s son), C. J. van Rooyen (Albany), F. H. Nuss, R. P. Martens, and G. T. van Rooyen (secretary).

PRESIDENT'S REPORT.

The following report of the President was read by the secretary:—
Gentlemen,—I have much pleasure in presenting to you my second annual report.

The Association has now been two years in force and we have a fairly good membership.

During the past year three special general meetings were held, at which there was an average attendance of 25 members. One committee meeting was also held.

The Agricultural Union.

We do not all recognise the good work that has been done and is being done by the Natal Agricultural Union, which is a powerful force in working out the destiny of the agriculturists in the Colony. We cannot, however, have it too clearly driven home to us, that if individual members of agricultural associations do not take an active interest in their respective associations and if farmers' associations such as ours are not properly supported the Union's power will be more or less weakened. We must see that every member of our Association has a good opportunity afforded him to state his views, and that the views of our Association are brought before the Union in proper form. If members will only think, they will see how valuable a privilege it is to have the views brought forward at our meetings. This Association was represented at the Congress by Mr. G. T. van Rooyen and myself, the results of which I have already reported to you in the meeting held in June.

East Coast Fever.

In regard to this terrible disease, the outlook, which was dark when we held our last annual general meeting, is very much darker to-day.

The disease has now come very close, the latest outbreaks being on farms Sutherland and Elandskop, while the disease is ravaging in the Nyoniyezwe Location and coming as far down as Paul's Mission Station, at the "Stikitiki." Gentlemen, let us therefore endeavour by every possible means in our power to prevent as far as possible the calamity which threatens to destroy our sole means of cultivating our farms. I firmly believe that the best known means of preventing the disease reaching us is to absolutely prohibit the movement of cattle in our Division excepting those which are removed for immediate slaughter. This, no doubt, puts us to a great inconvenience, but if, by enduring these comparatively small inconveniences we are able to save our oxen to draw our ploughs, etc., and our cows to supply us with milk and butter, we will be amply repaid for whatever inconvenience we may have endured. So long as we can have our oxen for farm work, I don't think our farming operations will be much interfered with. But if we lose them I must confess I see small prospect of our being able to do much in the way of producing crops. Let us not therefore become apathetic in our endeavours to fight the disease, but let us be very vigilant and erect fences and barriers wherever possible, and if we observe such fences as hard and fast boundaries we may hope to save our cattle for at any rate a few more years. I also recommend the cleansing of cattle from ticks, as it is well known that our greatest enemy is the tick. To destroy it altogether would be impossible, but I think we can go a long way if we continually clean our cattle. Since we had our last annual general meeting the Minister of Agriculture has abandoned the fight against the East Coast Fever and has handed matters over to Advisory Boards, but the disease is still spreading. I really think, however, that through the prompt steps and good management of our Advisory Board, who have worked so well for the good of all, that the disease has not spread more in our Division. Let us one and all do all we can to help the Advisory Board and think that we are one of the Board individually.

Mealies.

The general outlook for the future from a mealie-growers point of view is hopeful in spite of the East Coast Fever. The consumer, both in England and on the Continent has finally realised that the South African mealie is the best grown, so it remains for the farmer but to put something in the ground when he will gather from his labours results that will be eminently satisfactory from a financial point of view, and Natal should take its proper place as one of the big mealie exporting countries. I hope, gentlemen, that notwithstanding the severe set back in hailstorms, etc., the farming community have experienced this season, we will go forward with redoubled efforts. On the whole this district has made wonderful progress in mealie-growing. The quantity of mealies reaped and the yield per acre are steadily increasing. To-day we have the finest

and most up to date implements and machinery that the world can produce. Considering that stock-farming is greatly interfered with by Tick Fever Regulations, I would urge it upon every farmer to plant every available acre with mealies and apply fertilizers as much as possible and as far as his resources will admit, and I am sure, gentlemen, that your incomes will be doubled notwithstanding the ravages of East Coast Fever.

The Wattle Industry.

To-day, gentlemen, we have in our Division alone over 5,000 acres of wattles, and many more acres are still being put under cultivation. At the present time we have a very unreliable market, which causes us great anxiety at times. A meeting of wattle-growers called by the Minister of Agriculture was held in Maritzburg during November last to consider the advisability of having all bark graded and a Government mark put thereon before being exported. In my opinion, gentlemen, I consider this was a step in the right direction, and I attended the meeting. But the Wattle Growers' Union were opposed to such a step and many difficulties were pointed out. We should not, however, be discouraged at their decision. We in Krantzkop must combine and export our bark direct. I consider our bark in this Division is of a very high class, and I am sure we will not be long in establishing a sound and reliable market oversea if we combine and work honestly together in exporting only high class bark, while the inferior and young bark can be exported as such. The continually falling prices in Natal should urge us on to it, as in England corresponding reduction does not take place, and all our profit is going to the middleman, namely, the wattle-buyers in Natal. Both the secretary and myself have had communications from abroad, which I lay on the table for inspection, with a view of exporting bark direct and our future prospects seem very favourable.

Sheep Farming.

It is a pity that more of our farmers do not go in for sheep farming, which has undoubtedly proved to be a very prosperous pursuit. With Tick Fever threatening us from all sides, I consider we should go in more for sheep and improve our flocks. Native sheep-stealing, which was brought up by a member at one of the meetings during the year, is very prevalent, and he was perfectly correct in stating that it is very difficult to detect this everlasting evil. The detective scheme which is carried on in some of the Divisions is very expensive though the Government are prepared to meet us half way with the expenses, but the small flocks we have in this Division does not justify us to spend £10 or more a month in detecting the evil. Several acres of Paspalum have been planted by different farmers, and it has proved to be a very valuable winter grass.

The Labour Question.

Amongst other hopeful and promising prospects in connection with agriculture is the fact that native labour is abundant. I am amongst those who firmly believe that we have in the native race a sufficient and adequate supply of labour for all requirements of the Colony's industries. If this labour is not properly utilised there may be some grounds for saying that our labour supply must be supplemented by the introduction of the Indians, but I think this is a most dangerous expedient of getting over a temporary difficulty and will end only in future difficulty and trouble, and our native problem, which is very difficult of solution, will be ten times worse to deal with if we have a large and impoverished native population for whom we can find no employment.

Krantzkop Railway.

I cannot hold out any hope that our railway line will be built soon. The petition has not been presented to Parliament yet, but as soon as they assemble the petition will be there. I believe the Government have raised a loan for the construction of railway lines. A Commission was appointed, but they unfortunately took no evidence regarding our line, as I am certain we are justified in applying for it. Even if we leave our wattle out of the question, we have still a valuable asset in our live stock, and we will only then realise the amount of money there is in cream. I know from good authority that twenty-five cows can easily bring £18 to us in one month.

Fertilizers.

The secretary is endeavouring to induce farmers to co-operate and get their bone dust or other fertilizers through the Association in bulk. In this way we may be able to get it cheaper and long terms of credit until the farmers have reaped their crops. Those who are anxious to do this must hand in their names to the secretary and the quantity required. He will then communicate with the merchants, and if the executive committee consider the prices sufficiently low the Association can then purchase such fertilizers at the reduced rate. This has been merely suggested, and I trust this meeting will give it their earnest consideration. It may happen that it would not be necessary to do this, as there are great hopes that the fertilizer which is being dug out and crushed at Weenen may prove to be a great success. A test has been made and it has so far proved to be a valuable fertilizer.

Financial Position.

As you will see from the treasurer's statement of income and expenditure we have a balance on hand of £13 6s. 1d., which is very satisfactory. Many members are in arrear with their subscriptions, and they have had to be struck off this list of members according to the Rules.

During the year a syndicate was formed to experiment on a cure

for Tick Fever. I immediately called a committee meeting to encourage this syndicate but nobody attended. Myself and the secretary then took it upon ourselves and gave £6 towards it, as I considered every body of farmers like our Association must encourage a move in this direction. What is £6 if we consider the amount of capital in the live stock, and we really thought that we were doing the best for our Association. But on a general meeting being called our action was criticised and set aside, and myself and the secretary have refunded the amount to the Association.

We have now got a stand which the Government granted us for the purpose of building a public hall. We cannot, however, proceed with the building at once, but the stand was secured in case we required it, which I am sure we will build on sooner or later. Our Rules and Regulations have been registered, but we have not yet got the title deeds owing to the absence of the Governor.

I must conclude by tendering my thanks to all office-bearers, committee and members for their willing support and kindly help in the working of our Association, and in particular to our honorary secretary, Mr. G. T. van Rooyen, who, although a young man, proved himself an enthusiastic and competent worker.

Gentlemen, in electing me for two years in succession as your president you have honoured me, and I trust that my efforts in endeavouring to promote the welfare of our Association have given satisfaction.

The President's report was unanimously adopted, as was also a statement of income and expenditure read by the hon. treasurer. The following office-bearers were then elected:—President, Mr. M. Landsberg, C.O.; vice-president, Mr. P. R. Vermaak; committee, Mr. J. P. Nel, Elandskop; Mr. C. J. van Rooyen, Albany; Mr. L. M. J. van Rooyen, jun., Dr. Proksch, Mr. R. P. Martens, Mr. C. J. van Rooyen (L.'s son), Mr. J. A. G. Mare and Mr. F. E. van Rooyen; secretary and treasurer, Mr. G. T. van Rooyen.

After a little further business the proceedings terminated.

NOODSBERG.

The Noodsberg Road Agricultural Association held its annual general meeting at Wartburg on the 29th January, with Mr. Fritz Reiche, J.P., the President of the Association, in the chair. The attendance was not as large as on former occasions on account of the state of the weather.

PRESIDENT'S ADDRESS.

The Secretary having read the minutes of the previous meeting, the President delivered his annual report as follows:—

Gentlemen,—I have the pleasure of presenting herewith my annual report at the close of the eleventh financial year of the Noodsberg Road Agricultural Association.

Last year again our Association has not held the annual show to which we once used to look forward with pleasure, but under present circumstances the abandoning of the show was no doubt the wisest course to adopt. With East Coast Fever in front of us, and with limited funds in hand we should have faced failure in attempting to hold the show all the same. A good show or no show at all has been our motto from the beginning. It does not seem likely at present that country shows on the old lines will successfully be held for some years to come. Besides, with the present financial state of the Colony, it is hardly reasonable to ask Government for the accustomed subsidy to the show funds, and the private subscriptions can hardly be expected to improve. I advise all members of our Association who are eager to exhibit to support the Maritzburg Agricultural Show, and there to try for success in competition with the whole Colony. There are some difficulties to overcome in placing your exhibits on the Maritzburg show to the same advantage as you are used to on our local show, but a prize awarded there will be the more valuable to the successful exhibitor.

During the year we had a proposal before us to dispose of our Show Hall, but eventually better counsels prevailed, I am pleased to say, and our Show Hall was left standing, although there may not be special use for the building at the moment. I with others should much have deplored the falling of the hall, and the end of the Association, which no doubt would have gone hand in hand.

Our foremost and principal thought during the year centred in the approaching East Coast Fever, and I regret having to chronicle the outbreak of the disease in several parts of the Magisterial Division, although the central sub-division is still free as far as we know. Several meetings of our Association have especially dealt with this question, and the local Advisory Boards have not had altogether an easy time. Although the Minister of Agriculture had promised to give the Advisory Boards a free hand in their districts there have been frequent occasions for friction, and after all the Advisory Boards are not the institutions they ought to be. Their only use at present is to enforce proper fencing and to see to the destruction of ticks, which seem more numerous at present than for the last few years, especially after the sharp and sudden frosts the winter before last, which also no doubt killed a good number of insects and thus helped to keep our orchards free from them during the following summer.

Our Association also took shares in the Eacover Syndicate, which had been formed at Ladysmith, for the financial support of a veterinary surgeon who was said to have found a remedy for East Coast Fever, which was to prove by trial on a larger scale. Our Association and others willingly came forward, but in the end the management of this concern never informed us of the ultimate results, despite different enquiries made by our secretary. I strongly protest against this action, and I am rather

surprised at it, when looking at the names of the gentlemen who promoted the syndicate. I thought better of them!

These remedies are usually brought before the public with much bustle and end in dead silence. There certainly is no cure whatsoever yet, and very unlikely that one will be found. The only safeguard is the prohibition of all movement of cattle (including the movement of slaughter cattle from infected farms, which unfortunately the Agricultural Department will not enforce) and the stamping out process, if this had properly been taken in hand at the beginning. No single in-contact beast ought to have been moved from an infected farm. Much time, labour and money has been wasted already over this deadly disease, and is still being wasted, the only benefit perhaps going to cattle dealers, who must make good profits at the prices they pay at present to the farmers, who are at their mercy.

The only advice which reasonably can be given in the matter is a thorough fight against the ticks, which should be reduced to the possible minimum, and in the meantime fences to be kept in proper repair and farms guarded.

Good progress in agriculture is being made in our district, and the extended operations nowadays compare very favourably in every respect with former years. The mealie-fields get larger every year, and the cultivation shows a marked improvement, the results being accordingly satisfactory.

Early last season the grub in the mealies was bad throughout the district, but after we got over that stage, the local conditions were more favourable than in most parts of the Colony, and most farmers reaped good crops, which with the good prices of mealies were very welcome indeed.

Kafir corn has not had the same attention given to it as formerly, and a considerably less quantity is now being planted. The price offered for this article is certainly no inducement to extend its cultivation in preference to mealies.

More attention is now paid to the feeding of stock and to the improvement of the natural pasture by planting better grasses, the most favoured of which so far is *Paspalum*. There are few farms in the district, I believe, where you don't find this grass cultivated to some extent, and no doubt it takes a lot to beat. Another grass which of late was brought to our notice is *Phalaris commutata*, but even on the small experimental plots where it was planted in this district, very little or no satisfaction has been obtained as far as I know. Unless better results are shown at further trials we shall soon have heard the last of it.

Cream is now being sent regularly to Nel's Rust from several farms, and one cream separator after another finds its way into the district,

and this just at the time when we are seriously threatened with the loss of our cattle. We seem only now to realise the value of them.

I have to mention in these notes a new association which lately has been formed in the district—the “Natal Sweet Potato Growers’ Association,” and I trust that it will receive all possible support from those who are specially interested in this portion of farming. The principal aim of the Association, I understand, is the establishment of a starch factory, and if the promoters are willing and able to supply the necessary money, the first step towards ultimate success will have been reached. I heartily wish all possible success to this Association. Certainly sufficient sweet potatoes are grown, or, at least, will be grown, in the district if a factory comes into existence to keep it fully supplied.

The public roads of the district are, thanks to the retrenchment in the P.W.D., in a pitiable state, and travelling along the main road is by no means a safe thing and dangerous to life and limb at night. Although transport by ox-wagon is a thing of the past, we still have to carry our produce to market, or at least to the railway station, and Government ought to keep the roads in reasonable repair. This, of course, is not our only complaint, but it is one of which we are daily reminded. If we were a more cantankerous and noisy community we should perhaps have more attention paid us by the Government, but as it is we give them too little trouble and annoyance.

No visit to the Government Experimental Farm has been paid this year by our Association, and, in fact, I don’t think we are wanted there. With the present railway service it would take us three days to make the journey to and fro, and I much doubt that under these circumstances it will be worth our while going there. This, I find, is also the general idea, and no effort has been made to overcome the obstacles in our way. When the question was raised in one of our meetings a year ago, no member of our Association was anxious to go.

Before concluding, I wish to thank our secretary for the work he has done willingly and well during his term of office, as well as all members of the Association who have taken an interest in the welfare of the Association, and I hope that the good feeling amongst the members to which we have been accustomed will ever continue to our mutual benefit.

TREASURER’S REPORT.

Then the treasurer, Mr. P. Vietzen, presented the balance-sheet and read his financial report:—

“Mr. President and Gentlemen,—I have much pleasure in submitting to you herewith balance-sheet for the eleventh financial year ending to-day and closing with the amount of £329 11s. 7d. in your Association’s favour.

“The financial position of the Association may be looked upon as a

sound one, although I am sorry to state a considerable decrease in the membership has taken place. I do not think it necessary to further analyse the different items of income and expenditure, the nature of which, the balance-sheet duly audited, will clearly show.

"The sum of about £11 is still outstanding against members' subscriptions for 1907 and 1908.

"The meetings of the last year were, on the whole, well attended, and I hope that the interest in the proceedings of all the Association's business may not relax this year."

After a little further business a vote of thanks to the chairman terminated the proceedings.

RICHMOND.

On the 12th January the Richmond Agricultural Society held its annual meeting, with the president (Mr. John Marwick, J.P.) in the chair. Among those present were: Messrs. Chas. Nicholson, A. W. Cooper, J.P., T. Marwick, E. E. Johnson, Frank Nicholson, C. P. Lewis, R. Nicholson, H. M. Moyes, W. P. Payn, J. C. Nicholson, C. E. Simes, James Hackland, and Cecil Williams (hon. secretary).

The office-bearers for the ensuing year having been elected, the hon. treasurer (Mr. R. Nicholson) read his report, which was adopted. The president then delivered his annual address, as follows:—

Gentlemen,—The year 1908 having passed, and my term of office having expired with it, it is my duty to furnish you with a report, or resume of the business of the Society during the year.

As you are all aware, our show was abandoned at the last moment, partly on account of the East Coast Fever restrictions, but principally on account of the apathy shown by the local farmers with regard to the show, the majority neglecting to prepare exhibits, pleading as their excuse the restrictions caused by the East Coast Fever Regulations.

While willing to make liberal allowance for your feelings in consequence of the East Coast Fever cloud, I cannot but feel that your apathy has a more depressing effect than the disease itself. Agricultural societies in other districts held their shows as usual, most of them being very creditable exhibitions, notwithstanding the East Coast Fever, and I see no reason why this Society should not have done the same; however, as no show was held, I have nothing to criticise, that being the usual custom with retiring presidents. I, therefore, cannot do better than "retire on" the all-absorbing topic "East Coast Fever."

As you are aware, the disease is now, unfortunately, in two separate places in our Magisterial Division. Government has seen fit to remove all the infected and "in-contact" cattle from the place where the outbreak occurred at Mid-Illovo, a course of procedure which will, I hope, prevent the spread of the disease in that locality; but, unfortunately, the disease

has since appeared in the Nel's Rust area of this Division, and, judging by the information already received, I fear this is a rather serious outbreak, East Coast Fever having apparently been in existence among the cattle there for some time, unknown to the owner.

On the 20th December, 1908, the Minister of Agriculture prohibited all movement of cattle in this Division. I consider this to have been a wise proceeding on his part, and hope that he has not delayed too long in taking such action, but as we were unable to make up our minds to ask that the movement be prohibited, the Minister was obliged to take the matter into his own hands. I am confident that had he waited until those among us, who were in favour of stopping the movement of cattle, had gained sufficient adherents to form a majority, it would never have been enforced; even now, when the disease is actually in two portions of the division, the majority of the inhabitants are grumbling at being obliged to keep their oxen off the roads.

I do not anticipate the ruin of anyone, nor even the reduction in quantity of the produce sent to market, by reason of the prohibition of ox-transport; as long as we have our oxen with which to cultivate the land, and to produce crops, we shall devise some means for getting our produce to market; it is better to have the produce to sell, even if we experience some difficulty in getting it to the railway, than to be without either oxen, or produce; it is the fact of being forced out of the old groove that is causing the farmers to clamour so loudly, and to predict that all kinds of terrible things are going to happen to them, now that the movement of cattle is stopped.

As the stoppage has taken place at the slack time of the year, we shall have time to arrange for the transport of our biggest crop of mealies by the time it is ready next winter, and once started in the new groove, few farmers will return to the old one, even when East Coast Fever has become a thing of the past.

The recuperative power of Natal, and its farmers, is extraordinary. It is only eleven years ago that we were all in a "blue funk" about being "wiped out" by rinderpest; if we are only loyal to ourselves, and our neighbours, and co-operate in strictly carrying out the East Coast Fever Regulations, we have nothing to fear, and I hope in eleven years time we shall be able to look back upon East Coast Fever with the same feelings that we now have for rinderpest.

The mealie crop throughout the district was fairly good, and thanks to our being able to export to Europe, prices were good also. We naturally "feel a bit sore" that the price jumped up as it did, after we had all practically sold out. The East Coast Fever cloud, and the probability of the roads being closed to ox-transport, materially assisted in making farmers clean out their crops as they did; but the price being "right" was the main factor. Had the price been low, the farmers would have

made their sales "tail out," on the chance of prices hardening towards the end of the year.

The native crops were poor, and I think, with very few exceptions, natives are buyers of grain at the present time. The majority reaped sufficient to have fed themselves, but during the winter and early spring they sold their mealies to the nearest European or Asiatic storekeepers to buy luxuries, such as sugar, biscuits, beads, etc., etc. Judging by appearances, I do not think the native will ever have to be taken into consideration as a producer of grain; he will more often than otherwise be a purchaser. The days of unlimited virgin soil are past. When a native's fields are foul with weeds, he cannot now leave them to break up new ground, and clean, new land is the only kind of ground to which he ever gives a chance of producing a fair crop of anything; moreover, I am convinced that even were he given unlimited virgin soil, the present day native would never have two years of plenty in succession; the lean years will always alternate with the fat ones, as, whenever a native reaps a full crop, he spends his days in drinking it, and in consequence cannot spare the time to plant a fresh one.

Taken all round, the last season was a good one, and the present, so far, promises to be better from an agriculturist's point of view. A large area has again been put under mealies in anticipation of fair prices, and were it not for the East Coast Fever cloud the farmers' prospects would be good indeed. I wish here to remind farmers of the necessity for making liberal provision for the feeding of their cattle during the next winter, as there will be no chance of sending any of them to winter in the thorns; they will all have to remain on the farms upon which they are now running; and as nearly every farm in this district is fully stocked, it will be a serious matter for the man who has neglected to grow sufficient winter food for his cattle.

At the risk of being accused of "Blowing my own trumpet," I as president of this Society, must draw your attention as cattle-owners and agriculturists to the services rendered by the East Coast Fever Advisory Board. Your thanks are due to the members of the Board for the time and trouble they have freely and ungrudgingly given in your interests, to say nothing of the expense which members of such a body cannot avoid incurring. It is easy for people to grumble, and find fault with what is done; but you will usually find the principal grumblers among those who are ignorant of the circumstances, and who have never taken the trouble to ascertain the exact situation but who jump to conclusions and blame everybody but the proper persons—themselves.

Gentlemen, in retiring from the presidential chair, I wish to thank you for the honour you have conferred upon me by electing me to the position; I also tender my thanks to the members of the committee for the support and deference I have received at their hands.

Although the show was not held, nearly all the preparations in connection with the same were completed, when the decision to cancel it was made.

Your thanks are due to the hon. secretary and the hon. treasurer, also to the members of the committee, who did the work.

DURBAN AND COAST.

The eleventh annual general meeting of the Durban and Coast Poultry Club was held on the 25th January.

A report of the proceedings was published in the *S.A. Poultry Journal and Kennel Gazette* of the 15th instant, from which we make the following extracts:—

Mr. H. M. Fletcher, the Secretary, read his annual report and balance sheet. In the former he congratulated the club on securing the services of Mr. Short as president for the past year, and stated that to that fact was largely due the strong position in which the club was placed at the present time. He stated that the thanks of the club were due to those who had generously assisted by their donations to the prize fund, and to Messrs. A. Drew, J. F. Pearce, T. N. Price and others who had all helped to make the annual show the marked success which it undoubtedly was. Referring to the show, he said the weak point was undoubtedly the fancy pigeon section, in which the entries were very small indeed, the truth being that during the last few years fanciers of this section have decreased almost to the point of extinction on the coast, but if those in Maritzburg and Howick, in which districts some of the best stock in South Africa is kept, would give their assistance to the next show it would add immensely to its attractiveness. The poultry section was supported to almost exactly the same extent as in the previous years, whilst there was a considerable increase in the number of Homers on exhibition.

Turning to the financial position of the club, the Secretary stated that by careful management the club had been enabled to wipe off several outstanding liabilities, including an amount of £26 16s. 10d. due to the Dickinson Charity Fund, and the year ended with a substantial balance in hand. The membership of the club had increased from 81 to 127, and there was every prospect of a considerable accession of new members in the near future. The homing section of the club had made considerable progress during the year and its position was much more satisfactory than had been the case for some time past. This was shown by the number of rings which have been disposed of, viz.: 350 club, 400 produce and 250 "Dickinson," and considerably more could have been sold had they been available.

The Treasurer's statement of accounts, which was read by the

Secretary, showed that the revenue of the club from all sources amounted to £266 18s. 7d. and the expenditure £239 3s. 5d., leaving a balance in hand amounting to £27 15s. 2d., whilst, including the cash in hand, the club has assets amounting to £200 3s. 4d., exclusive of members' subscriptions, etc., unpaid, amounting to £26 16s. The liabilities of the club amount to £5 9s. 11d., which discloses a very satisfactory condition of affairs.

The President, in moving the adoption of the report, claimed that much had been done by this and other poultry clubs to raise the standard of poultry kept in the Colony. He referred to the fact that the importation of eggs into the port was decreasing, but drew attention to the extreme variation in the prices of eggs sold on the Durban market. The lowest point touched was 8d. to 9d. for good quality eggs in the month of September, whereas at Christmas the price had advanced to as high as 2s. 6d. per dozen. He contended that the lower price was not a profitable one, and that it was the legitimate business of a poultry club to devise means whereby the price should be maintained at a reasonable rate somewhere about midway between the two extremes. He also suggested that more should be done between the annual shows to justify the club's existence in the way of lectures on both "fancy" and utility questions. He referred to the last Conference of the S.A.P.A. and to the steps that were being taken to establish District Unions, but regretted that so far the Natal clubs had not been able to establish their branch.

The election of officers was then proceeded with. Mr. Wallis Short was unanimously re-elected President, and the following as Vice-Presidents:—Messrs. Frank Stevens, C.M.G., W. J. Mirrlees, C. F. Clarkson, F. A. Smart, A. Drew, S. Swayne, W. Chapman, D. P. Bennett, W. H. Logan and W. H. Royston. The Committee was elected as follows:—Messrs. Kettle, W. J. Royston, Fry, Carugati, Woodward, Pearce, Teague, Duke, A. E. Flowers and B. Wilson. Mr. H. M. Fletcher was unanimously re-appointed Secretary and Mr. Wayne as Treasurer to the club.

While you pause and hesitate, the man who decides has an advantage over you that you cannot gain in many years, if ever.

The man who sticks to one breed from year to year, through all its up and downs, is certain in the long run to enjoy the fruits of his constancy. A good poultryman can make a good success with any breed.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

** * Under the above heading we propose to publish each month in future short paragraphs on subjects of interest to the practical farmer, by recognised experts in agriculture and allied sciences.*

If common salt be sown broadcast on the stiffest clay, the solvent power of rain-water will be increased many fold, and a largely increased quantity of both potash and other substances required for plant food will be set free and made available for such food.—*John McKeague ("Practical Irrigation")*.

Scientific farming may be said to consist in part in filling the soil with cheap and refuse potential plant-food, and in taking it out of the soil as finished products so skilfully that the supply is kept equal to the demand, and this with profit to the farmer and benefit to the land. It is one thing to put potential plant-food into the soil, and quite another to get it out profitably.—*Prof. S. P. Roberts ("Fertility of the Land")*.

There can be no doubt that many valuable sows have been utterly ruined for breeding purposes, by over-feeding on corn [mealies] and meal, which, alone, possess too much heat-producing and too little bone and muscle-forming material to supply the needs of the animal economy. On this account, sows should not be allowed to run with fattening hogs kept on corn but in pasture, and allowed plenty of sop, made of equal parts of shorts, corn meal [mealie meal] and wheat bran.—*F. D. Coburn ("Swine Husbandry")*.

CO-OPERATIVE BANKING.

Wherever co-operative banking has as yet penetrated, it is specifically the poor districts rather than the wealthy that have shown themselves eager to take it up. The man who has got a little, and has become accustomed to old, hum-drum ways, fails to detect at once the advantages which co-operative banking offer to him. His tolerable familiarity with business, which ought, as one would think, to lead him to seize upon it with readiness, and discover in it many benefits, does not help him in his stolid submission to the existing order of things. The man who has next to nothing, to whom £1 may be a boon and £5 a treasure, who sees opportunities crowding in upon him, which, if small to others, are great to him, naturally has a much quicker eye.—*Henry W. Wolff ("Co-operative Banking")*.

ENSILAGE.

The secret of making satisfactory silage is careful control of temperature, and this is obtained by regulating the pressure. In a silo the greater the pressure, and the more quickly it is put on, the "sourer" is the silage; if a sweet product is required it is often necessary to fill gradually and press very lightly, so as to allow the temperature to rise. In a stack, on the other hand, prompt and heavy pressure is necessary, especially in the case of a succulent or very damp crop, to prevent the temperature getting at once too high.—*J. C. Morton ("The Crops")*.

SAND.

Pure sand consists almost entirely of small grains of silica or quartz and is not a plant food. Plants cannot use it. It is insoluble in water and in acids, and has no adhesive tendency; hence, acting as a divider in the soil, it makes the land easy to work and facilitates the passage of roots in search of food, and also allows the assimilation of irrigating waters. The amount of sand in the soil varies from eight to more than ninety per cent. It absorbs very little moisture or other fertilising material in the air, but retains heat much longer than any other soil constituent.—*Lute Wilcox ("Irrigation Farming")*.

THE ROLLER AND ITS USES.

The roller, in its relation to soil moisture, is an implement whose value depends largely upon local conditions. There is no tool which requires more judgment as to its proper use. On light, loose, sandy or gravelly soils, where every effort must be made to solidify and pack the particles closely together, the roller must be used repeatedly. The difficulty with such soils is that the spaces between the grains are so large that the water is permitted to pass through freely, and is lost by percolation. The capillary openings are so large that there is very feeble rise of the water to take the place of that used by plants and lost by evaporation. The roller lessens the size of these pores in solidifying the soil, and the capillary force is then strong enough to draw the water to the surface.—*L. H. Bailey ("Principles of Fruit-Growing")*.

DISEASED POTATOES FOR STOCK.

When the potato is attacked with disease, it is the flesh-forming constituents that are destroyed; these are converted into ammonia, and hence the offensive smell which is emitted from diseased potatoes. The starch, etc., remains intact, and advantage is taken of this by employing diseased potatoes in the manufacture of starch. Diseased potatoes may, for the same reason, be turned to account for feeding animals, particularly swine. In order to do this, it is necessary to thoroughly cook the potatoes either by boiling or steaming—the latter, when practicable,

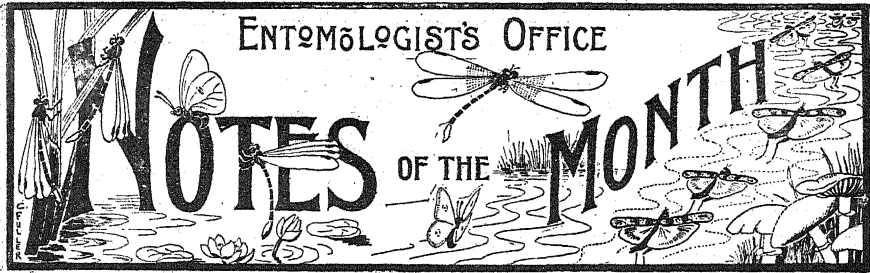
being the better way—and then pack the cooked potatoes into flour-barrels or casks, ramming them well down, and sprinkling some salt occasionally through the mass. When the barrel or cask is filled to the top, it must be closed from the air, and the potatoes will keep for some time fit for use.—*Oliphant Pringle* ("*Live Stock of the Farm*").

REMEDIES FOR BEE-STINGS.

It is difficult to tell which are the best remedies for stings. There is so much difference in the effect upon different individuals, and upon different parts of the body, as well as in the depth a sting reaches, that remedies effectual in one instance will be useless in another. Ammonia, soda, or salt and soda mixed, and slightly moistened, are probably as efficient as anything. Camphor, taken internally, seems to possess a virtue when the sting is severe enough to cause blotches upon the skin, as well as when applied externally. When stung in the throat, drinking often of salt and water is said to prevent serious consequences. Whether any of these remedies are applied or not, it is hardly necessary to say that the sting should be removed as soon as practicable. In doing this, it should be observed that as the poison sac is yet attached to the sting, it should be attracted in such a way as not to force any more of the poison into the wound. The sting may often be scraped off with a knife-blade, and the part be squeezed a little to force the poison out. It is unquestionable that the system becomes accustomed to the poison in time, and little annoyance is experienced by practical bee-keepers.—*L. C. Root*.

SECRETION OF MILK.

When the milk falls off in quantity, the first thing to suspect is something in the feeding or the watering. A cow will often fall off in milk when changed from dry feed in the spring, too suddenly or abruptly, to grass. The grass acts upon the bowels as a laxative and diuretic, and, in stimulating other organs, interferes with the secretion of milk by changing the currents of the circulation. It may not follow that a change from moderately good to more stimulating food will always produce an increase in the milk; if too suddenly made, the change may easily reduce the flow of milk for a time. In the same way the increased feeding will often so stimulate the milk organs as to cause them to pass blood into the milk ducts unchanged, instead of elaborating it into glandular cells which produce the milk, and then the milk is mixed with blood. This result may also occur from any undue excitement of the circulation of the udder, such as excessive exercise in running; or from bruising or pressure when a cow lies upon a well-filled udder; or from contact of the udder with damp or wet ground at any time, or with a cold floor in the winter.—*Henry Stewart* ("*Dairyman's Manual*").



Errors.

OWING to a somewhat extended absence from headquarters I had no opportunity of reading through the proofs of the notes published last month. In consequence thereof a number of typographical errors and omissions will not have escaped readers' notice. Fortunately none were of particular importance; attention is, however, drawn to the following:—

Page 79, last paragraph, sixth line, for "defoiled" read "defoliated."

Page 80, second last paragraph, fifth line, for "repidity" read "rapidity."

Page 85, fifth paragraph, third line, for "three" read "there."

Page 86, seventh paragraph, first line, for "deviation" read "derivation."

Page 81, fifth paragraph, second line, insert "bottles" after "glass-stepped."

The Golden Beetle.

The Golden Beetle, as it is commonly called, which has for years past been very prevalent and destructive in orchards about Estcourt, has more recently been complained of from the neighbourhood of Vryheid and Richmond. This insect, as a rule, appears in vast numbers either in December or early in January, attacking the ripening fruits and destroying great quantities. It is particularly partial to apricots, peaches and plums.

I have not had great opportunity of making any full enquiry into the life-history of this pest, and because of this have delayed publishing any account of it.

From the information at my disposal it would seem that the insects appear each year with unfailing regularity once they have become known in a plantation of fruit trees. This fact, in conjunction with a few field observations and numerous enquiries, brought the conviction that the beetles actually breed in the precincts of the orchard and not in the veld as commonly supposed, and, furthermore, the numerical increase often complained of was directly traceable to this circumstance.

I have taken what I believe to be the larvæ in the soil around the bases of trees usually infested, but have not been successful in my efforts to carry these through to maturity. My conclusions, subject, of course, to confirmation, are that the female beetles deposit their eggs in the soil of the orchards. (The fact that they are so distended with eggs as to be clumsy and incapable of great flight points to this conclusion being a natural one.) The young grubs—much like small cockchafer—find nourishment either upon grass roots or upon the roots of the trees themselves. (There is always plenty of grass in the infested lands.) The growth of the grubs takes place during summer, and it would appear, from the fact that they disappear from the superficial soil in the winter, that they hybernate and pupate more deeply down in the soil.

Among the suggestions put forward for mitigating this pest have been the spraying with arsenic compounds and the collection of the beetles, the latter being effected by placing sheets upon the ground under infested trees and jarring the beetles down on to these in the very early morning before they have become active.

Exception has been taken to both these treatments because one poisons the fruit (it would be practically ripe when sprayed) whilst the other destroys it by throwing it from the trees, so that I may say the few fruits saved from the beetles are apparently of more value than the getting rid of the pest. As a general rule the beetles foregather upon a few trees with ripe fruits and continue their depredations as the fruits on other trees reach maturity. Such a state of affairs naturally suggests spraying even at the loss of the crop upon several trees, and I am glad to be able to say that one fruit-grower at least has been entirely successful in destroying the swarm of beetles which appeared in his orchard recently.

The fruit, plums in this case, were sprayed with arsenate of lead (Swift's), and this stuck to the fruits so that they had either to be destroyed or washed clean of the poison.

As if bearing out my conclusions regarding the localised development of the pest, another farmer, who has been worried with these beetles for years, tells me that they have greatly diminished in numbers since he has turned the pigs into the orchard and allowed them to root about in it.



Mosquitoes.

House mosquitoes also are usually abundant during March, and are likely to be particularly so this year. The environment of the home-stead should be carefully searched for the puddles, cess pits, tanks and old bottles and cans in which they may be breeding. The last-mentioned, of course, can be emptied of their contents whilst the surfaces of other places can be treated quite inexpensively with paraffin.

Orchard Notes.**MARCH.**

It is hoped to publish under the above heading a series of monthly notes upon matters of current interest, and more particularly such orchard work as is usually necessary or recommended for the month. The writer is painfully conscious that the notes will present many shortcomings, but he trusts that they will receive a kindly reception and that his readers will contribute towards their utility by drawing attention to discrepancies, errors and omissions, so that in time a correct and reliable orchard calendar for Natal may be evolved.

Before the end of March most of the deciduous fruits will be disposed of because this season has been a particularly early one. But I think it will be found that, if ever anything is to be done in the export of pears and apples from Natal, it is only the late ripening varieties that it will pay to grow for this purpose. It is quite true that Natal-grown fruits, when they reach the local market, present a most unhappy appearance. This is due, perhaps, to hail scars, but more generally to blight and want of attention to the handling and packing. At the same time it is considerably enhanced by climatic conditions, our wet, hot summer tending to early ripening and the production of fruit of a more than ordinarily delicate texture—so that even with the greatest care it is liable to considerable injury between orchard and market.

It is well known to every housewife that fruit picked wet with rain or soon after a fall of rain will, when preserved, readily ferment, and similarly the constant advice given to pick fruit only when dry is based upon the fact that under other circumstances it is so easily bruised and decay so rapidly sets in upon the bruised areas.

Late apples and pears, more particularly the latter, should not be gathered before they are mature; but when the right time for picking does arrive the work should not be neglected. Even with apples, which can as a rule be left to hang longer than pears, the risk of an early frost should not be taken. As a general rule, late apples should be left upon the trees as long as possible, and picking commenced when full maturity is indicated by the fruit beginning to fall to the ground. Of course apples keep longer if picked before they are fully ripe, but such fruit never possesses the rich flavour and crispness of that which is fully matured upon the tree. Further than this, there is some evidence that immature fruit is more liable to develop "bitter pit" after picking than is the ripened fruit. This disease is, however, common enough in apples, particularly certain early and mid-season varieties even when fully ripened upon the trees. This insidious trouble, although not peculiar to South Africa, would appear to be very pronounced under our conditions and gives promise of proving the most potent drawback to the industry. Its

cause seems to be remarkably obscure, and unfortunately no treatment has, as yet, been devised to remedy it. The "Tulip," or "Dutch Tulis," is said to be immune to the disease, but more detailed data upon this point is required. It will probably be found that in certain soils and under certain conditions various kinds are more subject to "bitter pit" than are others, and evidence in this direction is most desirable.

Apples and pears must always be picked with the greatest care and bruising from any cause strictly avoided. The fruit should be picked dry and never immediately after a fall of rain if it is intended for market or for keeping. It should also be gathered cool, subsequently being kept as cool as possible and on no account should it be exposed to the blazing rays of the sun. Pick into baskets or shallow boxes which have been lined with dry grass hay and carry the fruit from these into the packing house; with pears it is preferable to place some grass hay between each layer of fruit. Never upon any account pour the fruit from one receptacle to another; this is a most careless procedure and the cause of much mischief; regrettably enough, an all too common practice.

Most fruits require a certain amount of curing or drying off before packing. In this Colony this will generally have to be done in sheds, but when the weather can be relied upon and orchard thieves are absent the fruit can be left under the trees in the orchard for twenty-four hours protected by some hay.

The first consideration in packing for market is the conscientious rejecting of all fruit struck by fly, blemished by hail or otherwise bruised or injured. This can always be used for jam-making and other household purposes. Every care should be taken to see that every fruit in a box is uniform—this is, all graded to the same quality and ripeness and all of the same equal size; further, the box should, of course, contain only one variety. If the fruit is to travel any distance each should be wrapped in paper and the box should be paper lined with perhaps a little woodwool in the bottom. If the grower wishes to secure the confidence of the buyer he will be absolutely honest in his packing, he will have a neat little design printed on his wrappers, his boxes will be bright and clean and clearly stencilled, showing the number of the contents, the grade and the name of the fruit.

In packing apples the fruit must be placed regularly in tiers and the layers so arranged as to send out a "full" box, the contents of which cannot rattle or shift about in transit. The lid should press down upon the fruit so as to "firm" the package. On no account must woodwool be used between the fruits.

Generally speaking, pears carry best in boxes of a single layer, and the more quickly the fruit is inclined to ripen up and become soft the more incumbent is it upon the grower to market these fruits in single layer boxes. Sufficient woodwool should be placed over and under the

fruit. Pears are always worth wrapping. They should be laid upon their sides, and a very nice pack can be obtained by placing the heads of the second row between the necks of the preceding and so on in succession until the stalks of the last row nearly reach the further end of the box, when it can be neatly finished off by reversing the last row. Of course all pears do not call for single layer packing, and some can be marketed in boxes of two and three tiers.

After the fruit has been harvested, orchard lands should be ploughed over. This breaks the soil hardened during picking and enables one to plough earlier in the spring. It is undoubtedly better and more profitable to put the orchard under bare fallow or a cover crop for the winter than to let the lands set hard. The common practice of awaiting for the advent of spring rains is a very bad one.

Black tares, green field peas and rye all make good cover crops, and where their planting is practicable they should be put in as early as possible. The idea of putting in a cover crop is not, of course, to harvest a snatch crop but to improve the soil by green manuring, the crop being ploughed in.

There are very few of our orchard soils that cannot be improved by liming, and March is a suitable month for making a dressing—say 1,000 pounds to the acre. Lime improves the soil in many ways and exerts a beneficial influence upon the growth of fruit trees. Its great influence lies in its sweetening effect—or the correcting of any acidity—thereby permitting the growth and general activity of the multitude of organisms or bacteria which flourish in a sweet soil and whose beneficial influence renders it the more suitable to plant growth.

If any extension of the orchard is contemplated, now is the time to prepare the land and order the trees for setting out in the early spring. Land prepared thoroughly now will make all the difference in the long run; and, whilst it is preferable to work the soil for a twelvemonth before setting out fruit trees, still it is better to get the soil turned over now for next spring plantings than to wait until just before planting, or, worse still, plant the trees in holes in the veld.

Citrus orchards need very particular and early attention and any spraying or fumigation for scale insects should be undertaken at once. If fumigating is not contemplated, growers should make up their minds to spray liberally with resin wash. By liberal spraying it is meant several or at least two successive applications at intervals of two to three weeks at most and regular treatment of such trees as continue infested.

In all practical work in Natal resin wash stands out as our most effective scalecide, and no one who has used it thoroughly doubts its effectiveness and economy.

All the ingredients for preparing the following formula can be conveniently purchased from the Natal Soap Works, Durban, who have made

special arrangements for supplying the required quantities to fruit-growers.

RESIN WASH.

Resin (ground)	24 pounds.
Caustic Soda (98 per cent.)	5 pounds.
Fish Oil (not cooking oil)	3 pints.
Water, for final bulk	100 gallons.

Boil ingredients in 15 gallons of water, using a 20-gallon Kafir pot, for two or three hours. If any tendency to boil over add a couple of pints of hot water. Strain and dilute to 100 gallons with cold water.

Advice.

Never add cold water to cooking mixture. The stock solution will keep, but the wash is best used as soon as made. An hour's boiling gives a mixture which may be used, but it will not prove as good as one thoroughly cooked.

If any sediment forms, cook up again.

A further matter for orange growers attention during March is the *gathering* and destruction of the yellowing oranges. These fruits are invariably "struck" by either fruit-fly or attacked by the moth. Left, in the ordinary course of events, the insects in these fruits come to maturity and attack the main crop as it ripens later and are a potent source of mischief. The moth breeds to a great extent in the small red or China guava, and every citrus orchard should be free from China guavas and loquats, if these two pests are to be kept at all under control. To get rid of such citrus fruits it is a good plan to dig a fairly deep pit in which they may be deposited; at least once a week a layer of soil four inches in depth should be deposited upon the fruits. This will effectively prevent the emergence of any insects which may reach maturity, and the following season the contents of the pit can be used for manure.

Those who have been at all troubled by peach aphid should search for hibernating colonies—now on and through the winter. These colonies may usually be found by watching the movements of any ants, and as often as not it will be found that the ants have carefully protected the small colonies by covering them with shelters of triturated matter, leaving only small openings as a means of ingress and exit for themselves.

Early attention should also be given to woolly aphid, because during this month winged individuals appear amongst those on the trees and these creatures carry infection further afield in the orchard.

The several severe hailstorms which have already occurred this summer have doubtless accounted for a good deal of injury to fruit trees, and these should receive special attention, more especially where any injuries occur among young trees.

Small hail scars usually heal over in the course of two or three

seasons; but, as often as not, they are as much the source of mischief as more extensive injuries. In apples they become the seat of canker or are aggravated by woolly aphis, and peach trees are invaded by fungi which set up decay in the woody tissue. Where larger areas are injured they only mean an aggravation of any of these troubles.

It is a wise plan to always aid Nature in the repair of these damages, and with a little judicious help parts that otherwise would remain open for years or even permanently can be healed completely. All that is required is to trim up all rough edges with a sharp knife and then paint over the wound with ordinary lead paint. Care must be taken to see that the paint is fairly thick and does not run, as otherwise it will do more harm than good. When carefully applied it forms a waterproof dressing to the wound and effectively prevents the entrance of the parasitic organism so likely to set up decay.

It is an extraordinary thing how frequently the tarring of wounds or putting rings of tar around the trunk of fruit trees is recommended by one amateur to another. I have met three cases in the last three months where this absurd measure has been employed and with the usual disastrous results. Naturally the man that recommends tar has never used it, and the one that adopts the specific never tries it a second time. Dame Experience keeps an expensive school and her lessons are usually bitter, but they are very valuable!

Those who intend putting in autumn buds to make growth the following spring will give the matter their attention during the month, and citrus growers will be getting in readiness for dealing with the early fruits of their orchards.

According to a recent issue of the *N.S. Wales Agricultural Gazette*, out of 400 varieties of apples tried at the Wagga Experimental Station only those enumerated below recommend themselves as the result of the experiment:—

APPLES.

Early.

Early Joe.
Reinette Jaune Hative.
Chemise de Soie Rouge.

Mid-Season.

Frampton.
Yates Nonpareil.
Rome Beauty.

Late.

Missouri Pippen, Granny Smith, Yates, Statesman, Prothis Winter.

This fact is very interesting as indicating the difficulty confronting an intending planter owing to the wide variety of sorts presented for his choice, together with the fact that one sort will do well in one district and not in another, a difficulty more intensified because it is impossible to obtain any definite information as to how the majority behave under any of our local conditions.

From experience also gained in New South Wales the "California" and "Elberta" peaches are found to be well worth a place in the orchard.

Speaking of peaches reminds one that a great many "Crawfords" have been sent up from the Cape during February to Maritzburg and Durban, and as much as sixpence apiece was being asked by one retailer in Pietermaritzburg.



Farm and Garden Notes.

By GEO. CARTER, F.R.H.S.

FARM WORK FOR MARCH.

MANY of the farmers in the uplands districts have suffered very severely from the recent heavy and almost incessant rains. Many crops must have been spoiled entirely. But this is not, perhaps, the most serious part. The very wet weather has prevented the sowings, usually made in February, of many winter food crops, and those who have been unfortunate enough to lose the proper season for sowing are asking themselves what it is possible to do now to provide food for the stock during the winter months.

The case is not quite so hopeless as it appears at first sight, as there are many really good fodder plants which, even sown now, will make good growth before the winter sets in. Dwarf Essex Rape is remarkably quick in growth, and often ready for use in two months from the time of sowing. Some of my farmer friends are now sowing a small proportion of White Mustard with the Rape, about one pound in ten, believing that it prevents "bloat." In the eastern O.R.C. many of the farmers are sowing the same proportion of Thousand-head Kale with the Rape. There can be no doubt that Kale is a much better drought resister than Rape, and a plant yielding far more food per acre, owing to its large size; but Rape is of far more importance at this late season—we must have something of quick growth.

Amongst the Cereals grown for winter green food, I think Speltz has a future before it in Natal and the high veld generally. About half a dozen farmers, mostly in the Balgowan district, tried a little last winter, and I have heard nothing but good of it. It seems to stand drought far better than Barley Wheat or Barley, or even Rye, and so far has not had a speck of "rust" in it. The food value is a little better than green Wheat, but does not quite equal Barley. But, then, food values generally have to take a second place where winter green foods

are considered. What we want is *quantity* of green food in a healthy condition first of all. If we can get the highest food value at the same time all the better.

I strongly suspect that this plant introduced into Natal as Speltz, or Spelt, is not the true Spelt at all, but what is properly called Emmer. This winter I intend to have a trial under close observation to settle this point. Emmer is much the hardier plant of the two, and very much appreciated in certain semi-arid parts of the U.S.A. It would be interesting to get a little seed of both winter and summer varieties of true Emmer for trial at Cedara and in some of the dry portions of Natal. I commend this suggestion to the Director. The grain is not much appreciated in America, but the green plant is rapidly gaining in popularity in dry regions.

Sowings of Wheat, Rye, Barley Wheat and Barley should be continued during March and April. Algerian Oats intended for both winter grazing and cropping in October and November should go in early in March. In the midlands, where there is a little land available, there is still time for a catch crop of Buckwheat, but this should not be sown where frost is expected before the end of May. It generally ripens seed with us in ten weeks, and eleven weeks is ample time for a full crop in the warm midlands. Millet may still be sown in such districts as Camperdown for "hay" crop only. I strongly recommend a trial of the "Golden" variety for this purpose. I put in four varieties of Millets on December 12 last, one of which was the "Golden." Red Pearl ripened ten days ago. White Pearl is ripe to-day (February 18th). Japanese will be ready in five days more. The "Golden" in ten days. The "Golden" variety, therefore, takes about five or six days longer than Japanese, but there is no comparison in the yield of fodder. The Golden Millet is a clear foot higher than Japanese, and the quantity of broad green leafage is remarkable. Judging from present indications, the yield of seed will be quite four times as much as any of the others. I will make a later report about this plant after the trial is complete.

Those who have sown *Paspalum dilatatum* this year should now add a little white clover to the field. It is very little use sowing the clover at the same time as the *Paspalum*. The latter is so slow in germinating (generally taking from three weeks or a month to appear, even in the best weather) that the delicate young clover plant, which germinates quickly, cannot get the shelter it requires, and it perishes. But when the *Paspalum* is well up, say, two months after sowing, the White Dutch Clover may be sown broadcast in favourable weather and rolled in with great success. The addition of clover is now quite common in Australia, and just a few of our own farmers have already found it a splendid addition to the *Paspalum* field. One would think that the *Paspalum* would choke it out, but such is not the case.

Now let me tabulate the work which may be done in March in seed-sowing:—

Rape, Dwarf Essex: In drills or broadcast, 4 to 6 lbs. per acre.

Speltz: Let every farmer try a little this winter.

Rye, Winter, about 50 lbs. per acre, broadcast.

Barley Wheat, about 70 lbs. per acre, broadcast.

Barley, Early Cape, about 70 lbs. per acre, broadcast.

Wheat, for winter grazing, and an after crop of grain, about 70 lbs. per acre, broadcast.

Oats, Algerian, 75 lbs. per acre, broadcast.

Buckwheat, Midlands only, a catch crop on vacant lands, 40 lbs. per acre, broadcast.

Millet, preferably "Golden," as a hay crop only, 20 lbs. per acre, broadcast.

White Clover. Added broadcast to the new *Paspalum* field, say, 5 lbs. to the acre, and rolled in.

THE HOME GARDEN.

March is probably the best month of the year to look after the Strawberry bed. Where good varieties are already established the old plants will now have thrown good runners, and these runners should have several good plants attached. To renew, take the two young plants nearest the parent plant only (throwing smaller ones away) and put these into well-trenched and manured ground at a distance of two feet apart between the rows and one foot in the rows. If this is done at once, while the ground contains plenty of moisture, the young plants will get well established before the winter, and will yield a splendid crop of fruit from September until the end of the year. To those who have no Strawberry bed, I say *make one this March*. No fruit gives greater satisfaction or does better in all parts of Natal, and the attention required is very little. Probably the safest and hardiest variety is the old Red Alpine, which, with us in Maritzburg, keeps on bearing profusely from mid-August until the end of January. Another really good sort is President Schlacter, not quite so prolific as Alpine, but the fruit is larger and richer in colour, not in flavour. For an extra early variety we think the best is King of the Earlies, which starts to bear in Maritzburg in July. These three are fairly hardy anywhere.

A Strawberry bed can easily be attended to by the "lady of the house" if the farmer is too busy. Plenty of Strawberries make a delightful addition to the household menu. Here is a recipe, which is not generally known, for the ladies:—While preparing the fruit as for making jam have pan on the fire containing the usual ingredients for a sugar and water syrup. As soon as this boils put in the Strawberries, and take off the pan *immediately* it boils up again. The Strawberries

barely have time to cook. They keep all the rich, natural colour and shape, and the flavour is such intensified. Serve with cream, of course.

The following seeds may be sown in March:—Curley Kale, Early Savoy, Carrots, Turnips, Cauliflower (midlands), Herbs, Lettuce (Cos varieties), Parsnip, Radish and a few Peas for succession. Get the Onion seed bought in for sowing early next month, and look at the Potato Onions to see if some of them are not ready for re-planting. Some of them are sure to be sprouting, and these should be the ones to put back for next year's supply.

In the flower garden succession sowings should be made of such standbys at Phlox Drummondii, Candytuft, Calendula, Dianthus. Lupins (the dwarf varieties, tall ones being too coarse for a good flower garden) will bloom very well if sown now. Stocks may still go in for August blooming. March is the best month of all for sowing Pansies in the midlands and warmer highlands. They will commence to bloom in June, and will continue to throw good large flowers right up to the hot weather. Get a good seed; there is no satisfaction in a second-rate Pansy.

The official organ of the Canadian Department of Agriculture says:—Reports from Nova Scotia indicate that the exports of apples from that province this year will be the largest on record. They will probably amount to 500,000 barrels.

Hens' eggs are preferable to pullets' eggs for hatching purposes, for as a rule the eggs from hens are larger and contain stronger germs which give more vigorous chicks. On the other hand, pullets are sure to produce the larger number of eggs.

The General Manager of Railways announces that, with effect from the 25th January, 1909, South African grain which has been exported oversea and re-imported into Natal will be charged at the railway rates applicable to "imported" grain in local traffic between Natal stations.

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

A REPORT from Java states that a sugar manufacturer has succeeded in producing a good fertiliser from a mixture of waste-molasses, ash from the furnaces, filterpress-mud and well-dried pen manure, says the *International Sugar Journal* for January. In fact, it contains everything that the cane takes out of the soil, and only the sugar, which, as everybody knows, is formed from the constituents of the atmosphere, is dispensed with. This new fertiliser bears the name of "molascinder" and contains 6.42 per cent. of nitrogen, 0.98 per cent. of phosphoric acid and 1.12 per cent. of potash; and in the coming planting season extensive experiments are to be made with this new method of restoring to the land all the elements withdrawn from it by the cropping.

Mules and Horsesickness.

The question of the "Immunity of Mules against Horsesickness" is discussed by Dr. Arnold Theiler, C.M.G., Government Veterinary Bacteriologist of the Transvaal, in the January number of the *Transvaal Agricultural Journal*, and the following conclusions are drawn:—(1) The experience in practice has shown that an inoculation of mules with any of the virus used protected against death to the extent of 1.3 per cent.; (2) the immunity is by no means absolute; (3) breakdowns vary in the different districts, and even in the same locality; (4) in the Laboratory it was possible to break the immunity given by almost any virus with blood obtained from immunised animals that died from horse-sickness after exposure. "All these facts prove the truth of the observation made by the South African farmer many years ago, and which he sums up in his remark that 'a horse may be salted for one district or for one locality, and is not salted for another.'"

Oil from Peach and Other Kernels.

In Bulletin No. 133 of the United States Bureau of Plant Industry Mr. Frank Rabak, Expert in Drug-Plant Investigations, points out the possibilities of the manufacture in the United States of oils from peach, apricot and prune kernels. "Large quantities of kernels, especially of the apricot, are exported annually from the United States at low prices to foreign countries and the products manufactured from them are returned to this country." He points out that, from the standpoint of relative composition, both the fixed and the volatile oils which can be

produced from kernels of peaches, apricots and prunes compare very favourably, and in some cases are almost identical, with the oils on the market obtained from the kernels of sweet and bitter almonds. "The physical and chemical properties correspond in a striking degree to those of the almond oils and point to an extremely close relationship."

The processes of extraction and distillation of fruit-kernel oils are stated not to be particularly complex and are such that the expense of maintaining and operating in establishments or canneries which are already equipped with steam and other power would be comparatively small. Attention is also called in the Bulletin to the value of the press cake, or kernels from which the fixed and volatile oils have been extracted. Important economic use might be made of these extracted kernels as stock foods or as fertilisers, owing to their high content of nitrogenous matter.

Moisture in Soils.

In the January *Transvaal Agricultural Journal*, Mr. Robert D. Watt, M.A., B.Sc., the Acting Chief Chemist, tells of an experiment he made in September with regard to the moisture content of soils. In the beginning of September his attention was called to the "dry land" winter wheat plots at Skinner's Court. One half of the plots looked much more vigorous and healthy than the other half. The only difference in treatment had been that the plot which was looking best had been harrowed once some time after the wheat was sown, whereas the other part had received no form of cultivation.

On the 4th September he took samples of soil from each plot, and determined the percentage of moisture present, with the following result:—*Uncultivated soil*: Top 12 inches, 8.66 per cent.; 12 inches to 24 inches, 12.28 per cent.—average, 10.47 per cent. *Harrowed soil*: Top 12 inches, 9.92 per cent.; 12 inches to 24 inches, 10.94 per cent.—average, 10.43 per cent. There was thus only a slight difference between the amounts of water in the two soils to a depth of two feet, and the smaller percentage of water present in the soil which had been harrowed would be more than accounted for by the larger quantity of water which must have passed through and been "transpired" by the larger crop. There was, however, one per cent. more moisture in the surface soil where the land had been harrowed. As very few of the roots reached a depth of more than a foot, the slightly higher percentage of moisture in the surface soil in the case of the harrowed plot doubtless accounted directly or indirectly for the increased crop.

Conserving Soil Moisture.

In a long and interesting article in the same issue of the *Transvaal Agricultural Journal*, Mr. William Macdonald, M.S.Agr., Dry-Land Agronomist, discusses "The Conservation of Soil Moisture." He points out that the first step in conserving moisture is to put the soil in such a condition that it will permit the rain to enter freely and into a good, deep reservoir. Water exists in the soil as free, capillary, or hygroscopic, but free water within eighteen inches of the surface is harmful to the growth of cultivated plants, whereas capillary water is the direct source of their supply, and should be conserved by all possible means. Capillary action, the author goes on to show, depends upon the fineness and the closeness of the soil particles. Consequently, in loose, coarse, sandy, or gravelly soils capillary action is weak, whereas in fine and well-compacted soils it is strong. If the capillary pores in the soil are continuous from the moist sub-soil to the surface, the moisture rises rapidly and passes off into the atmosphere by evaporation. When, however, these pores are made larger near the surface, the upward flow of the moisture is arrested. This can be done by light surface cultivation, which produces a "soil mulch." But as soon as the soil becomes baked or encrusted the capillary connection with the air is renewed, and tillage is again required to re-establish the soil mulch, and so conserve the moisture in the soil.

Manuring Wheat.

A report on the results of experiments in the manuring of wheat in the Western Province of Cape Colony is contributed to the February issue of the *Cape Agricultural Journal* by Mr. A. K. Hards, the Assistant to the Government Agriculturist. Several facts are clearly demonstrated by the results. The first is that basic slag on the whole did far better than superphosphate. The percentage of grain to straw was far better where basic slag was used in conjunction with other chemical fertilisers, as compared with superphosphates. In fact, in one case it comes very near the ideal of 50 per cent. grain and 50 per cent. straw. Basic slag not only supplies phosphates, but also 40 per cent. of lime, which tends to sweeten the soil and reduce it to a better mechanical condition, whereas superphosphate does not have this most desirable effect. It is clearly shown, for this reason at least, that nitrate of soda when used alone is of no value, as it resulted in a gain of only 1s. 4d. per acre over an average of 9 plots. This small return would not compensate for the trouble taken and expense incurred in applying it. The same applies to the combination of nitrate of soda and sulphate of potash, where an actual loss of 2s. 5d. was incurred per acre over an average of 9 plots. But where nitrate of soda was used in conjunction with phosphates, a decided increase was obtained. A combination of manures thus appears

to be the best, not only from the point of view that it tends to maintain the fertility of the land for a greater period, but it also gives the bigger profit.

Without doubt kraal manure is the best fertiliser that can be used in the Western Province from every point of view, but unfortunately its general use is barred owing to the fact that it cannot be obtained locally in sufficient quantity, and when run down from the Karroo the initial cost, plus railage, transport and handling, makes it prohibitive. "It will be noticed," Mr. Hards concludes, "that when nitrate of soda was used in excess of the other ingredients there was a tendency for the crop to go down to rust."

Moisture in Grain.

Circular No. 20 of the United States Bureau of Plant Industry deals with an electrical resistance method for the rapid determination of the moisture content of grain. The experiments, as recorded in the Circular, have so far been confined to wheat. The electrical resistance of wheat containing 13 per cent. of moisture is fifty times that of wheat containing 15 per cent. The temperature of the grain must be determined. The results of the experiments indicate that the moisture content can be determined by this method with a probable error not exceeding 0.3 per cent. Measurements can be made rapidly, requiring only two or three minutes. The apparatus is portable in character, so that measurements can be carried on in cars or elevators as well as in the laboratory. The use of this method in connection with other grains and grain products is, it is stated, now being investigated.

A Current Pump.

Various devices have been contrived to induce the current of a stream to deliver a part of its water at a point above, from which it can flow by gravity to the land on which it is to be used. A new device, patented by Robinson and Gaylor, of Thermopolis, Wyoming, floats in the Big Horn River at Thermopolis, and has, according to the *Pacific Rural Press*, for several weeks thrown a 6-inch stream of water to the top of the river bank 23 feet high. The stream will irrigate a 160-acre farm. If land lay higher this machine could irrigate it, as its capacity is a 6-inch stream 52 feet high. Machines of various sizes may be made, depending upon the volume of water desired and the height of the banks.

The machine in use consists of a wheel or drum 16 feet long and 6½ feet in diameter, made to revolve on a metal axis. To the outer surface are fastened longitudinal paddles, making a total diameter of 48 feet. The whole is supported and floated on a pontoon contrivance, the

paddles catching the current of the river and supplying power on the simple principle of an undershot water-wheel. The centre around the axis is simply a hollow core, and has no part in the work of the lift. Between this core and the outer surface of the drum is a spiral water channel extending longitudinally thereof. This channel has an open mouth or intake at one end extending slightly beyond the outer diameter of the drum, and so arranged that it faces in the direction of rotation and will dip a given quantity of water at each revolution of the wheel. At the opposite end of the spiral channel is an outlet consisting of a pipe which is connected to and discharges through the axis at one end, which is made hollow for the purpose. Attached to this by a swivelled arrangement is a 6-inch discharge pipe, the outer end of which is elevated to the height to which it is desired to raise the water. The intake, being submerged only a portion of the time, takes in only a prescribed quantity of water. As the wheel revolves, this water seeks the lowest part of the spiral channel, and is followed in turn by a given amount of air until the intake is again submerged. Thus the process is repeated, the spiral channel being filled with successive quantities of water and air. As it advances in the channel and the resistance becomes greater the air becomes more compressed, the channel being so arranged as to maintain the proper proportion of water and air through its entire length. The revolution of the spiral channel and the consequent compression of the air causes the water to be discharged with great force through the outlet by what might be called pneumatic hydraulic pressure.

Success is within the power of every business man; the paths that lead to it, the means of gaining it, are as varied as the natures that seek it.

You can't get a good hatch unless the eggs are fertile and very vital. Don't blame the incubator for poor hatches if the fault is in the vigour of the flock.

The official designation of Dr. Wilfred Watkins-Pitchford, hitherto Assistant to the Government Bacteriologist and Government Analyst, has been altered to that of Government Pathologist.

Correspondence.

WHEAT IN THE GOURTON DISTRICT.

MR. E. R. SAWER, the Director of the Division of Agriculture and Forestry, has received the following letter from Mr. W. Park Gray:—

SIR,—Not having finished threshing, I was unable to send you particulars sooner of a crop of wheat grown by me. In April last year, I, with difficulty, procured 100 lbs. of seed, called locally “rust-proof wheat.” This was planted in the end of April and was spread over $2\frac{1}{2}$ acres of ground. The soil was fairly rich and in good condition and received one irrigating during the winter. The crop was cut during the last week in November, and yielded $29\frac{1}{2}$ bags of 200 lbs. each, giving practically 12 bags to the acre. In May I planted a further 100 lbs. of seed, over 4 acres of very poor soil. This was cut in December and produced $4\frac{1}{2}$ bags to the acre. Algerian oats were planted alongside of the wheat and were reaped three weeks earlier, but only yielded 3 bags of 150 lbs. each to the acre. Algerian oats growing in amongst the wheat and alongside rusted badly, but not a speck of rust could be found in the wheat. The straw is very coarse and thick, some of it measuring quite $\frac{3}{4}$ of an inch in thickness 12 inches from the ground; this evidently is an advantage in giving strength to withstand the rust.

I intend planting a large acreage next season, as I am of opinion that it will prove a very profitable crop to grow.—Yours, etc.,

W. PARK GRAY.

MACHINERY AT SHOWS.

TO THE EDITOR OF THE “AGRICULTURAL JOURNAL.”

SIR,—In the December issue of the *Journal* appeared a letter by B. B. E. *re* machinery at shows. Your correspondent makes a suggestion to the effect that the agricultural societies should give a prize to the implement in the best or worst condition, after having been in use for two seasons, and having been over not less than 300 acres of land. I fully agree with the suggestion, and consider it would be the very best test that could possibly be given to any agricultural implement. Take ploughs: I have worked several different makes in my time, and whilst many of these will do splendid work for a time it invariably happens that after one or two seasons, after perhaps having gone over 200 to 300 acres, the implement fails to give satisfaction, and some defect or parts

that need improvement is noticeable, hence the manufacturer reaps the benefit at the farmer's expense.

A plough after having been over 300 acres would prove conclusively its good or bad qualities. I have had a plough of good appearance and in every way look as if it could have done first-class work in any soil, yet this plough in the first 30 acres proved itself quite unfit to do satisfactory work, and I had to cast it aside at a dead loss. Another one showed up a defect in first 20 acres, and had to be improved upon by me, by locking the parts with wire. All these things are very annoying, and I have now learned from experience never to buy machinery of any kind unless it is a brand that has stood the test of many years, and can be backed up by the opinions of farmers who have used them.

In these days of keen competition and rapid improvements in agricultural implements, farmers need to be very careful in buying new or improved implements unless it is one that has stood the test of some years.

I have always considered it would prove a good investment for agents or manufacturers, if when putting a new plough on the market, one such implement was handed over to some practical farmer, in say each Division, in order to advertise it, and to be used by the farmer for say one or two years, the farmer to pay for it at the end of this time should it stand the test and give satisfaction. The implement could be exhibited at shows, and any improvements or defects noted; but no doubt this would be looked upon as "too tall" an order.—Yours, etc.,

Bergville.

COUNTRY BUMPKIN.

PINEAPPLES, PAPAWS, ETC.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I crave the indulgence of a little space in your valuable *Journal* to insert the following notes which may, I trust, be useful to your farming readers.

It seems that Natal pines are appreciated in the London market, though the price is dull here at present. But unfortunately the culture is very defective in this Colony as far as I have seen. Simply to stick suckers in the ground and leave them to the mercy of weather will not produce a good specimen at all. I mean pines ought to be planted in beds. In making beds the soil requires to be well broken, and be sifted with a rake. Beds may be made wide enough to admit two suckers and length to one's fancy and the position of ground.

There must be drains between the beds, otherwise they will be washed away. Now and then every bed should be thoroughly loosened, without forming a crust. Suckers that grow on the stem are better suited for planting than those on the top. Lately I noticed in a Ceylon paper that

a Jamaica planter derives a handsome income by exporting excellent pines. Hence advanced culture will be productive of large delicious kinds, and the crop will be 99 per cent.

Some time ago there was an inquiry in the local press as to how to convert a male papaw tree into a female. The method is very simple: the natives of Assam top young male trees, and this progress changes the sex. The cut must be slanting, facing either north or south, just to avoid rain getting inside, and the rays of the sun. Raw papaws will make a dish of splendid white curry with shrimps, and first-class pickle mixed with vinegar, mustard, salt, and powdered dried chilly.

The other day fibre in the banana plant was hinted by a gentleman in the *Mercury*. The discovery is as old as hills, as in Ceylon the fibre is used in thatching and other purposes and it is made into soft cloth.

In short, pineapple and papaw have digestive power, and banana has more starch (some 47 per cent.) than any other fruit. Nutritious, sweet, cheap bread could be made out of banana flour, the recipe of which was published by me in the *Mercury*.—Yours, etc.,

J. J. DONE.

Lanka Lodge, Bellair.

LUCERNE CULTIVATION.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Can you advise me about lucerne for the coast? My soil here is a rich black stiff soil—granite foundation—but all on steep hillsides. Does lucerne necessarily require to be on a flat? It would be rather exposed to wind: would that matter?—Yours, etc.,

C. S. M.

P.O. Imbizana, via Port Shepstone.

[We referred the above enquiry to the Director of Agriculture and Forestry (Mr. E. R. Sawyer), who replies as follows:—The profitable cultivation of lucerne in South Africa is practically confined to deep alluvial vleis containing re-deposited lime, and I am unaware of any case in which steep hillside of granite formation has proved a satisfactory situation for this crop. Depth of soil is hardly likely to be adequate, nor is the amount of free lime likely to be sufficient to meet requirements of this legume. An analysis of Mr. Manning's soil would place us in a position to afford definite advice, but I do not contemplate being able to give a favourable reply.]

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of January, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'strain-fall in 1 day.		Total for Year from July 1st, 1908.	Total for sameper'd from July 1st, 1907.	
	Maximum.	Minimum.					Fall.	Day.			
Observatory ..	76.0	77.1	90.3	63.0	4.61	23	.80	14th	24.23	21.22	
Stanger ..	85.3	69.4	107	53	5.38	17	1.56	13th	26.28	29.26	
Vernham ..	87.8	69.0	103	62	4.48	17	1.18	13th	25.14	22.32	
Greytown ..	81.7	56.0	95	45	10.99	15	2.18	13th	30.36	25.77	
Lidgetton ..	81.0	56.5	93	43	10.62	19	1.51	28th	28.05	—	
Estcourt ..	83.1	59.1	98	52	6.91	14	1.75	13th	19.79	20.93	
Bulwer ..	—	—	—	—	9.81	23	3.33	11th	36.43	29.00	
Ixopo ..	—	—	—	—	4.79	19	1.20	12th	23.62	—	
Imbizana ..	81.6	66.4	93	58	4.10	13	1.58	31st	28.03	—	
Port Shepstone ..	86.9	62.5	95	55	3.06	9	.90	31st	27.62	21.12	
Umzinto ..	88.9	59.4	94	55	5.23	13	1.2	12th	26.82	20.16	
Richmond ..	80.9	59.7	96	45	9.15	17	2.92	11th	34.14	26.57	
Maritzburg ..	83.7	61.5	98	53	8.53	19	1.46	4th	24.71	23.24	
Howick ..	80.9	59.0	91	52	9.83	18	1.95	20th	27.40	25.10	
Dundee ..	78.9	61.0	92	51	11.22	12	2.46	11th	29.41	21.62	
Weenen Gaol ..	89.7	61.0	103	57	9.08	17	1.71	12th	24.47	20.86	
Charlestown ..	74.2	54.8	87	47	9.32	20	1.46	5th	27.75	21.24	
New Hanover ..	84.4	60.4	98	51	8.37	21	1.90	13th	28.68	26.88	
Krantzkop ..	84.7	72.9	97	69	7.14	5	1.17	13th	22.69	—	
Nqutu ..	76.4	53.5	89	49	10.12	19	3.67	11th	28.88	18.64	
Mtunzini ..	84.3	60.4	98	50	8.53	19	3.00	20th	39.51	31.66	
Elabisa ..	81.9	61.4	90	55	12.99	15	3.14	20th	33.06	20.55	
Melmoth ..	—	—	—	—	6.21	22	1.06	21st	22.10	18.94	
Umbombo ..	81.4	64.2	95	59	14.03	13	5.00	21st	34.88	22.50	
Point ..	—	—	—	—	4.22	19	.50	13th	28.30	27.17	
Krantzkloof ..	81.5	65.7	95	58	5.82	21	1.23	14th	25.87	—	
Mahlabatini ..	82.5	51.3	89	46	8.63	14	2.32	20th	25.61	20.33	
Empangeni ..	89.5	69.3	97	60	5.19	6	2.21	20th	27.01	27.98	

Meteorological Observations taken at Private Stations for Month of January, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain- fall in 1 day.		Total for Year from 1st July, 1908.	Total for same period from July 1st, 1907.	
					Fall.	Day.			
Adamshurst	—	—	7.76	14	1.50	3rd	25.21	—	
Hilton	95	48	1.61	19	3.11	20th	28.95	30.98	
Ottawa	—	—	5.0	5	1.97	14th	25.11	27.85	
Moun. Edgcombe ..	—	—	4.54	14	1.10	14th	25.99	29.43	
Cornubia	—	—	4.36	—	—	—	—	22.19	
Milkwood Kraal ..	—	—	4.18	—	—	—	—	17.14	
Blackburn	—	—	4.32	—	—	—	—	19.19	
Saccharine	—	—	4.8	—	—	—	—	20.19	
Equeefa	97	64	4.32	12	1.30	12th	26.13	29.43	
Umzinto, Beneva ..	—	—	4.48	13	1.23	11th	25.98	29.85	
Harden Heights ..	—	—	7.70	16	—	—	—	—	
New Hanover	—	—	12.95	21	1.99	8th	4.37	—	
Umhlangeni	95	—	3.28	14	0.65	24th	25.79	—	
Bransholme	—	—	1.95	21	1.99	8th	42.37	53.74	
Cedara—Hill Station	88	48	9.39	22	2.27	23rd	—	—	
Vlei Station	92	47	8.36	21	1.87	20th	—	26.80	
Winkel Spruit	89	62	3.89	15	0.77	11th	25.70	37.69	
Weenen	93	67	9.59	11	1.89	4th	—	—	
Giant's Castle	75.6	44.2	11.32	26	2.51	12th	28.50	21.37	

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of January, 1909 :—

COLLIERY.	Average Labour Employed.					Output.
	Productive Work.			Unproductive Work.*	Total.	Tons. Cw.
	Above Ground	Below Ground.	Total.			
Natal Navigation ..	377	616	993	5	998	26,133 0
Elandslaagte ..	334	697	1,031	22	1,053	15,766 19
Glencoe (Natal) ..	253	420	673	70	743	13,607 9
Natal Cambrian ..	217	411	628	3	631	12,406 6
Dundee Coal Co. ..	261	453	718	22	740	11,283 18
St. George's ..	241	370	611	—	611	10,351 13
Durban Navigation ..	165	385	550	—	550	9,933 0
South African ..	95	248	343	33	376	9,346 3
Talana ..	152	371	523	17	540	8,032 19
Newcastle ..	87	398	485	—	485	6,388 4
Natal Steam Coal Co. ..	89	214	303	17	320	4,732 11
Hlobane ..	91	196	287	58	345	4,106 7
Ramsay ..	93	216	314	20	334	2,666 19
West Lennoxton ..	65	124	189	—	189	2,531 3
Central ..	38	62	100	—	100	1,037 10
Hatting Spruit ..	15	57	72	74	146	951 8
Zululana ..	25	23	48	—	48	302 0
Ballengeich ..	—	—	—	78	78	253 6
Vryheid ..	4	4	8	—	8	32 0
Dumbi Mountain ..	2	—	2	—	2	2 0
Totals ..	2,608	5,270	7,878	419	8,297	139,864 15
Corresponding month, '08	2,303	4,792	7,095	234	7,329	130,815 7

	Productive Work.			Unproductive Work.	Total, Jan., 1909.	Total, Jan., 1908.
	Above Ground.	Below Ground.	Total.			
Europeans	193	135	328	63	391	373
Natives	955	3,456	4,411	253	4,669	3,663
Indians	1,430	1,679	3,109	98	3,207	3,293

* Cost Charged to Capital Account.

† December return.

Mines Department, Maritzburg, 8th February, 1909.

CHAS. J. GRAY,
Commissioner of Mines.**RETURN OF COAL BUNKERED AND EXPORTED.**

Return of Coal bunkered and exported from the Port of Durban for the month of January, 1909 :—

	Tons.	Cwt.
*Bunker Coal	57,031	0
Coa Exported	40,640	13
Total	97,671	13

Includes 495 tons taken by H.M. Warships.

Customs House, Port Natal 15 Februar 1909.

GEO. MAYSTON
Collector of Customs.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	T. Kirkness ..	Calfontein
A. B. Koe ..	Portion of Estcourt	Lungsickness	C. Wortmann ..	Rensburg Drift
		Scab	Cooke Bros. ..	Cypherfontein
		"	A. W. J. Hattingh ..	Kop-aagte
A. C. Williams ..	Utrecht ..	"	E. Mattison ..	Calcate
		"	B. & H. Hattingh ..	Lageraad & Welgeoon
		"	P. Delport ..	Mootspruit
		"	L. Schwekkar ..	Kalkrantz
		"	M. Prinsloo ..	Watervl
		"	S. Gubler ..	Schuin's Hoek
		"	H. A. Potgieter ..	"
		"	W. du Plessis ..	Vaalbank
		"	Uninaug ..	"
		"	C. Webb ..	Waterval
		"	M. van Rooyen ..	"
		"	M. Hattingh ..	Boschhoek
		"	Umbanja ..	Grootvlei
H. Van Rooyen ..	Babanango ..	"	J. P. Botha ..	Spitskop
		"	Mgantge ..	Verdiend
		"	M. op ..	"
		"	W. Liversage ..	Langfontein
		"	Cyanga ..	Verde veld
		"	Konksa ..	Vaalbank
		"	Ngeta ..	Pandasgrop
		"	C. P. Lau entz ..	Wydgelegen
		"	L. Potgieter ..	Gelykwate
		"	Hende ..	Aandasgrap
		"	F. C. Scheepers ..	Rooipoort
		"	C. van Rooyen ..	Paardepoort
		"	G. van Rooyen ..	M. Isboom
		"	Andrias ..	"
		"	L. Lauschagne ..	Friskewacht
J. G. Speirs ..	Impendhle ..	"	Pinda, Vete & Sobuon	Furth
L. Trenor ..	Alfred ..	Lungsickness	Shilwana ..	Location
		Scab	Yalwayo ..	"
		Lungsickness	Dumas ..	Location
		"	M'Nyango ..	Thluku
		"	Uy mbi ..	Location
		"	Mlotshwa ..	Msingopansi's Kraal
		"	Hogg Bros. ..	St. Mary's
		"	M. Clothier ..	Slexcel
		"	Tom Fynn ..	"
		"	E. M. Etheridge ..	Selhurst
		"	John Ryan ..	Norburg
		"	A. Fynn ..	Paarde Kraal
		"	M. C. Zietman ..	Ikayolami
		"	H. M. Raw ..	Orange Grove
		"	Majavus ..	T. Fynn's Location
		"	J. S. Payn ..	Phoenix Park
		"	J. J. Oosthuis ..	The Gorge
		"	J. H. Payn ..	Burnside
		"	Byel's Kraal ..	T. Fynn's Location
		"	H. M. Raw ..	Elands Drift
		"	Elijah ..	Sheepwalk
		"	Mashuma ..	Hoje
		"	R. Fann ..	Blackwater
		"	F. Mziz ..	Lot 1, Enquabeni
		"	E. Mzizi ..	Lot "F" Enquabeni
		"	J. T. Clothier ..	Whitewiff
		"	J. J. Oosthuis ..	Harding Town Lands
		"	Swenyas ..	Blackwater
		"	G. Larkan ..	Antioch
		"	Injongaved ..	Rydal Mount
		"	Mdingwas ..	Lot 3
		"	C. Knox ..	Knoxwood
A. S. Parkinson ..	Lion's River ..	Scab	Sigunu ..	Lot F.
C. T. Vaughan ..	Paulpietersburg ..	"	A. C. Thomson ..	Lion's Bush
		"	B. Greene ..	Mansfield
		"	P. Allen ..	Welverdiend
		"	J. B. Rudolph ..	Bosch Krans
		"	R. Craig ..	Frischgewagd
		"	Wm. Craig ..	Elandsberg

RETURN OF FARMS UNDER LICENCE (Continued).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWN R.	FARM.
R. Wingfield Stratford	Newcastle ..	Scab	G. van Niekirk ..	Rattlekloof
		"	R. P. Botha ..	Lekkwater
		"	M. Katzenstein ..	Town Lands
		"	Manning & Broods ..	Geeilhoutboom
C. E. Walker ..	Portion of Estcourt	Lungsickness	H. Cadle and other ..	Scotsfontein
		Scab	Alfred Carter ..	Glendone
		"	Chas. B. Lloyd ..	Hitcote
G. Daniell ...	Vryheid ..	Lungsickness	N. C. H. Little ..	Leighton
		Scab	Hlonvendluni ..	Dubblerech
		"	J. M. Koekemore ..	Hardetaald
		"	E. Mhlalose ..	Metzefontein
		"	W. Schultz, H. Tsherpia & H. de Lange	Hardbetaal
		"	Swikwana ..	Nooitkedacht
		"	R. Manaze ..	Aanstool
J. R. Cooper ..	Nkandhla & Ngutu	"	Thomas & Mahawlo ..	"
		"	L. Mloyi ..	Mgabeni
		"	S. Mboyi ..	Mgazini
		"	B. Bunting ..	Nqudeni
		"	S. Molife ..	Haladu
		"	M. Malagwano ..	Blood River
		"	Langa ..	Batshi
		"	Linjaza ..	Telezi Hill
		"	L. Molife ..	"
		"	H. Sutton ..	Masinkoms
		"	Westbrook Bros. ..	Dawin
		"	L. Msimango ..	Milane
		"	Charlie ..	Mas-djeni
		"	C. M. Sekosana ..	"
		"	M. Ndhlovu ..	Dalaza
		"	U. Ndhlovu ..	"
B. Klusener ..	Port Shepstone ..	"	B. Scott ..	Murphison
E. Varty ...	Western Umvoti ?	"	E. Varty ..	Blackwater
		"	Gert van Rooyen ..	Pinedale
K. Ripley ..	Emtonjaneni ..	"	Baleni ..	Mfuli M.S.
		"	Janga ..	Mangwaza M.S.
		"	Patakali & David ..	Rusteverwreht
		"	Ndat'mbi ..	"
		"	Uzweinjani ..	"
		"	Pawel ..	"
		"	Ntshsheweze ..	Protest
		"	Bambelela ..	"
J. F. van Rensburg	Ngatshe ..	"	Jakob ..	Zalinger
		"	T. C. Va Rooyen ..	Welkom
		"	Simon ..	Smaaldeel
J. Stewart ..	Bergville ..	Lungsickness	F. R. Stockie ..	K. it Vlei
E. W. Larkan ..	Umsinga ..	Scab	J. J. Strydom ..	Hester
		"	T. H. Dedekuid ..	omerset
		"	Amos Nahlovu ..	Nazareth
		"	E. Dubois ..	Uitval
		"	V. L. Whelan ..	Martin
		"	E. Dubois ..	Vergelegen
		"	Oyugulangans ..	Umsinga
		"	Gogo ..	Somshoek
R. Mayne ..	Eastern Umvoti and Krantzkop	"	L. M. J. van Rooyen ..	Scotsdale
		"	P. E. Botha ..	Olivefontein
		"	J. J. van Rooyen ..	Krantzkop
		"	W. W. Mare ..	Doornhoek
		"	J. L. F. Martens ..	Boeder's Hoek
		"	P. J. Nel ..	Ongegend
		"	R. P. Martens ..	Jammerdal
		"	L. J. Nel ..	Wilgegend
		"	L. L. Nel ..	Maresdal
E. W. Bowles ..	Ixopo ..	"	Ngevana ..	Arundel
		"	Bogwan ..	"
		"	Genisani ..	"
		"	Magewana ..	Klepat
		"	Nodwenw ..	"
		"	Ixopo ..	"
		"	Vuquza ..	"
		"	Putza ..	"
		"	Nduba ..	Waverley
		"	Njunza ..	South Hills
		"	Makafana ..	Waverley

RETURN OF FARMS UNDER LICENCE (*Continued*).

STOCK INSPECTOR.	DISTRICT	DISEASE.	OWNER.	FARM.
E. W. Bowles ..	Ixopo	Scab	Dumdum	Kolston
			Nqaye	Waverley
			Umenyana	Kolston
			Mancansika	"
			Unvakatshe	"
			Umbabala	Iprisugval
			Kebe	Location No. 6
			Luzi	Location
			Sabexa	Springvale
			Janga	Location No. 6
			G. Way	Herdstone
			Njoyetaba	Lot 29
			Thelwana	Lot 55
			Samtombi	Emerald
			Gungatshi	Location No. 3
			G. Thomson	Valahalla
			G. H. Cooper	Avetary
			D. E. Hardman	Ellington
			W. W. Watton	Rocky Halton
			Turana	Lot L.H.
			Mandemba	Lot D.U.
			Tebenga	"

MANGE IN HORSES EXISTS AS UNDER

Owner.	Farm.	District.
Pinda, Vete & Sobuon ..	Strathsoon	Impendhle
Natives	Olivefontein	Umvoti
Natives	T. tworth	Lion's River
Natal Police		Greytown

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 3RD MARCH.

Hilton Road.—Three wether sheep, branded O.O. on rump.

Muden.—Light brown mule mare, branded V.R., H.D. and T. on left hip ; very wild.

Ngutu.—White he-goat, no brands or marks.

Umsinga.—White sheep, no brands or marks.

ON THE 17TH MARCH.

Donnybrook.—Reported by E. G. Collis, Defice Farm, as too wild to be driven to the pound :—Brown filly, no brand, 2 hind feet white, white streak on nose, 2 years old.

Estrourt.—Four Kafir goats, no brands or marks, except that three have a V-shaped clip on the left ear and one on the right ear.

ON THE 7TH APRIL.

Pietermaritzburg.—Running on the Farm, Short's Retreat, and reported by J. B. Palmer as too lame to be driven to the pound :—Dark brown mule gelding, indistinct brand on near shoulder, cast military brand, near quarters.

Agricultural and Other Shows, 1909.

DUNDEE (Dundee Agricultural Society).—Show, 10th and 11th June. J. McKenzie, Box 105, Dundee, *Secretary*.

GREYTOWN (Umvoti Agricultural Society).—Date not fixed. W. H. Gibbs, Box 24, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Date not fixed. E. V. Bambrick, Box 90, Ladysmith, *Secretary*.

NEW GERMANY (Durban County Farmers' Association).—No separate show contemplated; but it is intended to join the Durban and Coast Society for the purpose of making complete exhibit of Durban products.

PIETERMARITZBURG (Royal Agricultural Society).—Show, 17th, 18th and 19th June. Duff, Eadie & Co., *Secretaries*.

PIETERMARITZBURG (Natal Poultry Club).—Show, 17th & 18th June. A. J. Peters, Box 197, *Secretary*.

UMZINTO (Alexandra Agricultural and Horticultural Association).—Show, 8th July. George Lamb, Box 68, Umzinto, *Secretary*.

CAMPERDOWN (Camperdown Agricultural Society).—Show, 23rd July. Messrs. Walker & Burchell, Camperdown, *Secretaries*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—14th, 15th and 16th July. J. Morley, 399, Smith Street, Durban, *Secretary*.

HARDING (Alfred County Farmers' Association and Agricultural Society).—Show, 23rd June. H. C. Hitchins, "Hluku," Harding, *Secretary*.

NEW HANOVER (New Hanover Agricultural Association).—Show, 30th July. W. D. Stewart, New Hanover, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Byrne Farmers' Association; Eshowe District Farmers' Association; Richmond Road Farmers' Association; Donnybrook Farmers' Association; Ladysmith Farmers' Association; Hatting Spruit Farmers' Association; Boston Farmers' Association; Little Tugela Farmers' Association; Umvoti Farmers' Association; Highflats Farmers' Club; Vryheid Agricultural Society; Garden Castle Farmers' Association; Nottingham Road Farmers' Association; Seven Oaks Farmers' Association.

OTHER SOUTH AFRICAN SHOWS.

The following dates have been fixed for Agricultural Shows in other parts of South Africa outside of Natal:—

Cape Colony.—Cradock, 16th & 17th March; Grahamstown, 18th & 19th March; Kingwilliamstown and East London (combined Show at Kingwilliamstown, 10th & 11th March; Middelburg, 2nd & 3rd March; Molteno, 2nd & 3rd March; Oudtshoorn, 7th & 8th April; Port Elizabeth, 23rd, 24th, 25th & 26th March; Wodehouse, at Dordrecht, 17th March.

Orange River Colony.—Bloemfontein, 16th, 17th & 18th March; Edenburg, 12th March; Fauresmith and Jagersfontein (combined), 9th & 10th March; Frankfort, 4th March; Harrismith, 3rd & 4th March; Heilbron, 31st March & 1st April; Kroonstad, 10th March; Senekal, 5th March; Thaba Nchu, 3rd March; Vrede, 10th March; Winburg, 9th & 10th March.

Transvaal.—Barberton, in July; Carolina, 10th March; Heidelberg, 7th April; Marico, date not yet fixed; Pretoria, 1st, 2nd & 3rd April; Standerton, 24th March; Witwatersrand, at Johannesburg, 14th, 15th, 16th & 17th April; Wolmaranstad, 5th May.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Government Laboratory.

SCALE OF CHARGES FOR ANALYSES, VACCINES, ETC.

The following is the scale of charges fixed for analyses, etc., at the Government Laboratory, Allerton, Pietermaritzburg:—

Drinking-water Analysis:				£	s.	d.
Chemical	...	...	...	2	2	0
Bacteriological	...	...	...	5	5	0
Milk, Analysis	...	...	...	0	10	6
Sputum, Bacterioscopic examination	...	...	...	0	5	0
Biological test for Tubercle	...	...	...	1	1	0
Throat-swabs for Diphtheria (prepared swabs obtainable on application):						
Bacteriological Report	...	...	...	0	2	6
Urine, ordinary clinical examination	...	...	...	0	5	0
Quantitative estimation of glucose	...	...	...	0	10	6
Biological test for Tubercle	...	...	...	1	1	0
Fæces, for Ankylostomiasis	...	...	...	0	2	6
Blood (collecting outfit obtainable on application) agglutination test for Typhoid (Widal), Paratyphoid, Malta Fever, etc.						
Malta Fever, etc.	...	...	...	0	5	0
Tumours and Morbid Tissue:						
Microscopic examination	...	...	10s. 6d. to	2	2	0
Post Mortem examinations	...	...	10s. 6d. to	5	5	0
Toxicological examinations	...	...	10s. 6d. to	21	0	0
X-ray examinations, blood-counts, etc., by special arrangement.						

The following sera, vaccines, etc., are issued at the prices indicated:—

	s.	d.
Anthrax Inoculation, per double dose of two inoculations	0	6
Anti-Diphtheritic Serum, per dose	5	0
Anti-Streptococcic Serum, per dose	2	0
Anti-Tetanic Serum, per dose	2	0
Mallein, per dose...	0	4
Tuberculin, per dose	0	4
Anti-Venene (for snake bites), per dose	5	0
Blue Tongue Vaccine, per 25 doses	2	0
Blue-Tongue Curative Serum, per 50 cub. c.	2	6
Quarter Evil Vaccine (in five and ten dose packets), per dose	0	3
Q. E. V., Double Inoculation, per dose	0	6

Appliances for inoculations, syringes, etc., are also supplied from the Laboratory.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 111.—Married man, 36, no children, desires managership of farm. Spent five years with Capt. Hayes, and is well acquainted with the management of horses, including racing horses. States he has sound veterinary knowledge and understands dairy, poultry, pig, and stock farming generally. South African experience, four years Cape Colony and one year Impendhle Division, Natal. Is prepared to work for month or two for board and lodging to prove capabilities, provided sound opening at end of that time.

No. 113.—Age 27, desires to obtain a start on a farm in Natal. Came to South Africa six months ago; attended the preliminary classes at the Glasgow and West of Scotland Agricultural College, and has also obtained a certificate for Theoretical Agricultural Chemistry. Is steady, and would be willing to work without any salary in order to obtain a practical knowledge of farming.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

	Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
			Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300 lbs. weight.	Over 300 lbs. weight.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1. Receiving per head	0 3	0 6	0 6	0 6	0 3	0 3.
2. Killing and Cleaning "	2 3	3 6	2 9	3 3	2 6	3 0
3. Labour "	0 3	0 6	0 3	0 6	0 3	0 6
4. Disinfectants "	0 1	0 1	0 1	0 1	0 1	0 1
5. Bagging (4 Quarters) per body	1 9	3 0	2 6	2 9	2 3	2 6.
6. Cleaning of Tripes each	0 6	0 6	0 6	0 6	0 6	0 6.
7. Chilling of Beef, up to 72 hours or portion thereof per body	1 0	2 9	2 0	2 6	1 9	2 6.
8. Chilling of Offal, up to 72 hours or portion thereof per set	1 0	1 0	1 0	1 0	1 0	1 0.
Chilling and Freezing Beef—						
9. 1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9.
10. 2nd " " " " "	1 0	4 0	3 3	3 6	3 3	3 3.
11. 3rd and remaining weeks or portions thereof "	0 8	3 0	3 0	3 0	3 0	3 0.
Chilling and Freezing Offal—						
12. 1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4.
13. 2nd " " " " "	1 0	1 3	1 0	1 0	1 0	1 0.
14. 3rd and remaining weeks or portions thereof "	0 9	1 0	0 9	0 9	0 9	0 9.

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars, apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

East Coast Fever Advisory Committees.

(NOTE.—Owing to sparse European population, the following Magisterial Divisions have no Advisory Boards: Ubombo, Mapumulo, Ingwavuma, Mahlabatini, Ndzwandwe, Nkandhla and Hlabisa.)

ALEXANDRA.—Chairman: W Thompson, Umzinto. Members: H Bazley, R C Archibald, A Blamey, H Reynolds, G J Crookes, R Parkin, J A Curle.

ALFRED.—Chairman: Magistrate. Members: A G Prentice, Rev. S Aitcheson, J E Brown, F H Boddy, H M Raw, H Rethman, H C Hitchens, H J R Hatchwell, W P Bouserie.

BERGVILLE.—Chairman: T E Zunckel, J.P., Bergville. Members: P H Vander Riet, J G Fannin, H Jackson, C Halferty, F Zunckel, Mbulali—Consulting member for natives.

BULWER.—Chairman: Magistrate. Members: R Comrie, Wm Colville, R Gordon, H Cole, P Garson, P McKenzie, G Malcolm, H C Gold, R Justice, E Stafford, W Little.

CAMPERDOWN.—Chairman: A N Kirkman, Cato Ridge. Members: J F Erfmann, P J Kingham, W B Turner, C J A Scheepers, W Mercer, L G Wingfield Stratford, J W Harvey, B B Evans, J W V Montgomery, B R Buchanan, W L Stead. **SUB-DIVISIONAL BOARDS.**—No. 1. *East of Railway Line from "Spitskop" to Railway Line.*—Chairman: J F Erfmann, Cato Ridge. Members: P J Kingham, H Dinklemann, F L Meyer, J H Meyer, H A Meyer. No. 2. *East of Railway Line from West of Government Fence.*—Chairman: C J A Scheepers, Thorneybush. Members: W B Turner, W Mills, J F Scheepers, H Nadauld, G S Phipson. No. 3. *West of Railway Line from Koning Krantz to Killairney and along Umlaas River.*—Chairman: A N Kirkman, Clairmont. Members: W Mercer, W Brown, R Godfrey, W S Meyer, E W Meyer. No. 4. *West of Railway Line, rest of Division between Main Line, Umlaas River Boundary of No 3.*—Chairman: W L Stead, Thornville Junction. Members: F H Meyer, J R Schwegmann, W E Schwegmann, W S Crouch, B R Buchanan (Hon. Sec., Manderston). No. 5. *West of Main Line, Beaumont, East of Main Mid-Illovo River from Westley's Drift to Umgwaranta River.*—Chairman: J W Harvey, Camperdown. Members: L G Wingfield Stratford, R Lyne, C A Hutton, E H Hayes, F E Groom. No. 6. *Mid-Illovo West of Line, rest of Division South of Umlaas River.*—Chairman: B B Evans. Members: J W V Montgomery, J H McCullough, J Ballam, J James, H S Power.

DUNDEE.—Chairman: F Turton, Glencoe Junction. Members: J Campbell, J J Grove, H Wiltshire, G M De Waal, Aug Jansen, A J Potgieter, A Cronje, A Schuid, H Greenhough. **SUB-DIVISIONAL BOARDS.**—*Glencoe Sub-area.*—Members: F Turton, H Greenhough, W H Miller, F Schroeder, V Marshall, J Lausen, J J De Jager, Rev Father Rauch (Native interests). *Hatting Spruit Sub-area.*—Members: J J Grove, H A J Davil, A E Norman, J Campbell, Rev J Dewar (Native interests). *East of Helpmakaar Road.*—Members: A M Cronji, D C Pieters, P Meyer, J A Naude, A Jansen. *West of Helpmakaar Road.*—Members: A J G Meyer, A P Lund, D C Uys, A J Van Tonder, Jun, A J Potgieter. Members of Joint Committee for Area West of Helpmakaar: A J Potgieter, A P Lund. Members of Joint Committee for Area East of Helpmakaar: A Jansen, A M Cronji. *Area between Main Vryheid Railway Lines.*—Members, W Craig, H Wiltshire, C M Meyer, Sen, A Spies, Jun, C M De Waal.

DURBAN BOROUGH.—Chairman: E L Acutt, Durban. Members: H R Bousfield, R Benningfield, G Swales, J Haynes, — Arthur.

EMTONJANENI.—Chairman: Magistrate. Members: F W Smith, H J James, F W White, A W Symmonds, R J Ortlepp, D C Uys, L J Van Rooyen.

ESHOWE.—Chairman: A Boast, Magistrate. Members: A Moore, G H Hulett, C F Adams, T Parkins, A T Wantink, F J Dickens, H H Thole.

ESTCOURT.—Ward 2. *East of Main Line.*—Chairman: A Stuart. Members: Magistrate, J Ralfe, J W Haw, J G Hatting, A Peniston, A B Haviland, G M Rudolph. Ward No. 3. (Boundaries): The Bergville Magisterial Division, Tugela

to junction of the two Tugelas; The Winterton Settlement fence to Vaai Plaats fence and Ovington and Sibhamie's Location fence, and from there to Government Game Reserve).—Chairman: H J De Waal, Glenisla. Members: R Gray, M Sanderson, R J Land, A Spearman, H L Bacon. *Ward No. 4* (Estcourt West of Railway Line; follow Bushman's River as far as Mr. Kerr's farm, then Nalaara's Location fence as far as Game Reserve).—Chairman: R H Ralfe. Members: F C Schiever, J Rencken, W Couch, P Male, T L Fyvie, J Hatting, A W J Hatting. *Ward No. 5* (Boundaries: Remainder of District West of Line).—Chairman: H Blaker, Estcourt. Members: W Comins, E B Griffin, H A Woodruffe. Col. Crompton, J Russell, A C Robinson, Jun, A E Downing, A D Shaw, J W Bentley.

GREYTOWN.—Chairman: Paul Hansmeyer, Greytown. Members: D Havemann, A Newmarch, J A Nel, W T Slatter, A T Handley, H S Botha. *Central Board*.—Chairman: P Hansmeyer, Greytown. Members: J A Nel, A Newmarch, W J S Newmarch, T K Taylor, S W Cadle, R J Van Rooyen, E J Van Rooyen, J G Nel.

INANDA.—Chairman: C R Bishop, J.P., Umgeni. Members: R Harrison, W Sykes, Jun, E Dore, W Campbell, R Armstrong.

KLIP RIVER.—No. 1 (A line from Elands Laagte along the Matawaans and Jononos Kop to the Berg; North line, Dundee boundary: all West of Main Line).—Members: C Mitchell Innes, R M Gray, L Meyer, J C Henderson, C Allen. No. 2 (O.R.C. line and boundary No. 1). Members: D Bester, A J Marais, W Allison, J Bester, — Brink. No. 3 (From Klip River Bridge to Sand Spruit, and up Sand Spruit to its source in the Berg).—Members: H A Potgieter, A A Wetherell, B Nel, F Van Rooyen, H Portsmouth. No. 4 (Rest of Division South and East of Sand Spruit and West of Main Line).—Members: W Leathern, H Illing, J H Newton, E Robinson, G W Willis. No. 6 (Whole of Division East of Main Line).—Chairman: J G de Waal. Members: R A Smith, H Nicholson, P Cronje, J Farquhar.

KRANTZKOP.—Chairman: L L D Proksh, Krantzkop. Members: L M J Van Rooyen, L M J Van Rooyen, F E Van Rooyen, J H Van Rooyen, J P Zietsman, A Johnson.

IXOPO.—Chairman: Magistrate. Members: Thos Allen, Geo Martin, E Marriot, A Stone, G A Cooper, J.P., Wm Gray, D Campbell, F L Thring, J.P.

LION'S RIVER.—No. 1 (Southern portion of West of Main Line).—Chairman: U K McKenzie, Lidgetton. Members: R J Spiers, F North, A McLean, J Morphew. No. 2 (Northern portion West of Main Line).—Chairman: G Ross, Nottingham Road. Members: J Clouston, K Soutar, D Connel, D Smythe. No. 3 (Southern portion East of Main Line).—J W Dicks, "Rosebank," Howick. Members: W M Henderson, — Buchanan, Jos Raw, H J McKenzie. No. 4 (Northern portion East of Main Line).—Chairman: H Burgmann. Members: W Methley, G Hutchinson, J J Morton, B Taylor. (The whole of the members of the Sub-Divisional Boards constitute the Central Board with the Magistrate, Lion's River, as Chairman.)

IMPENDHLE.—Chairman: T Fleming, Boston. Members: J Martens, P J Lourens, T Carter, C W Brooke, J W McLean, H Boike, C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell. *Sub-Committee appointed for Northern portion of Division* (added to Lion's River Division).—Chairman: P J Lourens, Insinga, via Nottingham Road. Members: H Boek, C N Brooke, T Carter, J Martens, J W McLean. *Sub-Committee for Southern portion of Impendhle*.—Chairman: T Fleming, Boston. Members: C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell.

LOWER TUGELA.—Members: W H B Addison, A E Jackson, H E Essery, A S L Hulett, J Brown, W O Robbins.

LOWER UMZIMKULU.—Chairman: Col. J F Rethman, North Shepstone. Members: Col. J R Royston, D C Aitken, J.P., C H Mitchell, J.P., G P Beachcroft, Claude Manning, H Albers, N Harper, J S Clarke, A Borchard, T Stapleton, Col. Bru-de-Wold.

MOOI RIVER.—Chairman: W. G. Randles. Members: J. H. Wallace, H. F. Cadle, R. Garland, John Bartholomew, J. W. Johnstone, C. R. Skottowe, J. N. Boshoff, J. R. Lindsay.

MTUNZINI.—Chairman: Magistrate. Members: F Green, G M J Gielink, G Getkate, W Saville, A H Konigkramer.

NEWCASTLE.—No 1 (to be known as Charlestown-Ingogo District from main line of Railway where it strikes the Southern line of the farm Cloutant West, thence along Western boundary of said farm, thence along S. W. boundary of Tipperary West, thence Southern boundaries of Hamstead, Dumferline and Roodeport, thence along the Northern side of the Botha's Pass main road to where it joins the O.R.C. Boundary, thence along the boundary of the Colony, thence along the Charlestown Fence to where it joins the Railway line near Mount Prospect Gate, thence along the Railway line to Cloutant West).—Chairman: J Vos, Charlestown F.O. Members: W J Adendorff, A J Johnstone, A Paine, A H Trouw, Angus Wood. No. 2 (Newcastle district Southern boundary of No. 1 along Railway line from Cloutant West, including portion of Town Lands, Newcastle, which by agreement with Government is considered to be West of line, thence along Railway line where it strikes the Southern boundary of the farm Kopjeallen, thence along Southern boundaries of Kopjeallen, The Gardens, and Lincoln to the Ingagane River, thence up the Ingagane up to the farm Falixtowe, along Southern boundaries of Falixtown, B Iwerton, Brooklyn, Stonehenge, Tathamscamp, Hanover, Ellensdale, Endsel, Bejuisel, Stelazies Kop, Mount Blanc, to O.R.C. border fence, thence along O.R.C. boundary joining Southern boundary of No. 1 at Botha's Pass).—Chairman: S W Reynolds. Members: F A R Johnstone, W Moller, J.P., L H S Jones, C Earl, F Meyer, J J Muller, — Van Breda, J Macdonald, J C Adendorff, E Sanders. No. 3. *Dannhauser District* (Bounded by Southern District No. 2 from the Railway line at Kopjeallen to the Berg, thence along O.R.C. border, the boundary between Newcastle and Klip River Divisions, thence along the Railway line to the farm Kopjeallen).—Chairman: W L Oldacre, Dannhauser. Members: Geo Friend, B Harrington, L J Muller, J Ecksteen, E Hodson, W Watson, Ted Twyman, G Langley, Don Urquhart. No. 4 (East of Railway Line, along the boundary between Newcastle and Dundee Divisions from the Railway Line near Dannhauser to the Buffalo River, along the Buffalo River to the junction of the Ingagane, thence along the Ingagane to its junction with the Ineander, thence along the Ineander to the fence of the Newcastle Town Lands, known as the Eastern boundary of the Railway Line, thence along the Eastern side of the Railway Line to the Magisterial Division boundary near Dannhauser).—Chairman: T K Boshoff, Dannhauser. Members: J H Potgieter, H Miller, J H van der Westerhuizen, J J Kemp, W Dicks, C Uys. No. 5 (the strip of land lying between the Railway Line and the Buffalo River from the Ingagane and Ineander streams, which form the North-Western boundary of No. 4 district).—Chairman: E W. Noyce, Boscobello P.O.; members, Geo Matthews, T K Panzera. *Central Board*.—Chairman: S W Reynolds, Newcastle. Members: F A R Johnstone, J Vos, Sen, Angus Wood, W Oldacre, W Watson, E W Noyce, F N Panzera, T R Boshoff, J H van der Westhuizen.

NEW HANOVER.—Central Board. Chairman: E Newmarch. Members: W W Bentley, T C Wolluter, F Reiche, H Schmidt, E Lindhorst, W L'Estrange, A F McKenzie, W Meyer. *New Hanover Sub-Committee*.—Chairman: E Newmarch. Members: Jno Moe, W W Bentley, W Ortmann, T C Wolluter, O J Muirhead. *Dalton Sub-Committee*.—Chairman: W L'Estrange. Members: A F McKenzie, R W Smith, G Reddinger, H Rosenbrock, J H Gordon, W Meyer. *Schroeders Sub-Committee*.—Chairman: F Reiche. Members: H Schmidt, E Lindhorst, G Moe, P Rodehorst, H T Rohrs, F Gorden, A Meyer, W Fortmann.

NQUTU.—Chairman: A Barklie. Utrecht. Members: H Wilkins, R L Flindt, W A Westbrook, J W F Hall, Dr. Knight.

PAULPIETERSBURG.—Chairman: N J Els, Viljoen's Rust. Members: J B Rudolph, G J Combrink, A Schutte, A Bester, P H van Rooyen.

PIETERMARITZBURG.—Chairman: B Swete Kelly. Pietermaritzburg. Members: W S Crart, C A Fawcett, W E Goodwin, E G McAlister, E E Hodgson.

RICHMOND.—Chairman: Magistrate. Members: E E Johnson, J Mapstone, G D Alexander, C P Lewis, C Nicholson, W Comrie, John Marwick, W P Payn, A H Ceeckburn. *Sub-Division No. 2*.—Chairman: G D Alexander, Nel's Rust. *Sub-Division No. 5*.—Chairman: W Oldfield, Fox Hill.

REIT VLEI DISTRICT.—Chairman: D. E. Muir, J.P., Elsmore, Mooi River. Members: P. Otto, J.P., R. J. Van Rooyen, E. J. Van Rooyen, J. G. Nel, A. Kohrs, J. Hooper, Otto Norton (Hon. Secretary).

SEVEN OAKS DISTRICT.—Chairman: W J S Newmarch, Harden Heights. Members: H M Balding, J.P., J Crow, J T Martens, H Mayne, S W Cadle.

UMGENI DIVISION.—Chairman: E. S. Goodwill. Members: F. Schroenn, B. Crompton, C. Arnold, R. J. Potts, A. J. Tyler, F. J. Smith, A. Wood, J. P. Symonds, J. J. Potterill, W. H. Keytel, C. Lund.

UMLAZI.—Chairman: C Henwood, Durban. Members: W Pearce, W Gillett, H Freese, L Jackson, P W Mackenzie.

UMSINGA.—No. 1 District (All farms lying West of the Umsinga-Helpma-kaar main road).—Chairman: E C Nuss. Members: W W Strydon, J.P., J H Nuss. No. 2 District—(All farmers East of the Umsinga-Helpmakaar main road—excepting the farms Sutherland, Gordon, Memorial Mission and Pomeroy Town Lands, and Location lying North of the Mazabeko and West of the Buffalo River.—Chairman: W H Wholberg, P.O. Elandskraal. Members: H W Dedekind, J Dedekind. No. 3 District—(The remaining portion of the area lying in the Umsinga Division).—Chairman: A Muller. Members: M J Matheson, H Muller. The three Committees to constitute the joint Committee.

VRYHEID.—Chairman: A von Levetzow, Vryheid. Members: P Labuschagne, B E A Rabe, G M van der Westhuizen, J F Potgieter, L M N Nel.

WEENEN.—Chairman: C G Jackson, Weenen. Members: C Harding, J.P., P J van Rooyen, J.P., K Rottecher, S B Buys, J J Vermaak, L C Kinsman, J W A Pole, C F Vermaak, P R Buys, J C's son.

Executives of Farmers' Associations.

ALEXANDRA AGRICULTURAL AND HORTICULTURAL ASSOCIATION.—President: Wm Thompson. Hon Vice-Presidents: A Blamey, E W Hawksworth, Thos Kirkman, H Basley, J L Knight, R.M. Hon Secretary and Treasurer: Geo Lamb. Hon. Auditor: W B Brunner. Committee: W Arnott, H G Arbuthnot, R C Archibald, R G Archibald, J Bazley, A Behrmann, W Cooke, G J Crookes, R Cruickshank, H D Hawksworth, H E Hawksworth, A F W Hawksworth, R C Hawksworth, J Landers, D McAndrew, F Nelson, C A Preston, Dr. Rouillard, W A Gilbert, Fred Blamey, Rev B M Ford, S C Hawksworth, J C Landers, S F Crookes, J J Crookes, R A Lindsay, J A Curle, F B Preston, R Parkin, H Reynolds, J B Stewart, C Taylor, H H P Waller, J Ross, Rev W C Wilcox, Dr W P Tritton.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A G Prentice, J.P. Vice-Presidents: C Knox, J.P., L T Trenor, and C A Holwell. Hon. Secretary and Treasurer: H C Hitchins. Committee: C M Etheridge, R Fann, J.P., V Hitchins, S Aitchison, J.P., W B Rethman, Dr Case, J.P., H Rethman, R G Mack, J Hogg.

BOSTON FARMERS' ASSOCIATION.—President: Thos. Fleming, J.P. Vice-President: T. W. Rudland. Hon. Secretary: W. J. Fly, J.P. Hon. Treasurer: H. A. Phipson.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J Gavin and John W Harvey, J.P. Hon Secretary: W E Allsopp.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon, J.P. Vice-President: F N Meyer. Hon Secretary: J Baker. Committee: H Baker, J Gavin, J W Harvey, J.P., W B Turner, H H Hutton, C Baker, H E Meyer.

CHARLESTOWN FARMERS' ASSOCIATION.—President: Johannes Vos. Vice-President: — Adendorff. Secretary: W. J. Curnow. Treasurer: J. O. Thomas. Committee: H. O. Eksteen, J. P. Vos, J. C. Uys, W. G. Thomas, D.

Doyer, F. A. R. Johnstone, M.L.A., G. E. Lane, S. R. Higgins, B. F. Johnstone, A. J. Johnstone, J. J. Eksteen, R. H. Greaves, Peter Thompson, G. McArthur, and V. B. van Rooyen.

DRONK VLEI FARMERS' ASSOCIATION.—President: Capt Perceval. Vice-President: Alban Hodson. Hon Secretary and Treasurer: Edward Marriott.

DUNDEE AGRICULTURAL SOCIETY.—President: T. P. Smith. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, F. Thurton, and W. Craig. Hon. Secretary and Treasurer: J. McKenzie. Committee: A. W. Smallie, W. J. H. Muller, G. M. de Waal, B. J. Humann, R. Retallack, H. Ryley, H. J. Head, C. T. Vermaak, H. P. Walker, J. Dyson, H. Wiltshire, J. Campbell, H. Greenhough, D. W. H. Tandy.

DURBAN AND COAST SOCIETY OF AGRICULTURE AND INDUSTRY.—President: E. W. Evans. Vice-Presidents: Sir B. W. Greenacre, A. M. Campbell, Hon. Marshall Campbell, M.L.C., W. Adams, Frank Stevens, C.M.G., M. S. Evans, M.L.A., P. D. Simmons, W. R. Poynton, Hon. C. G. Smith, M.L.C., G. S. Armstrong, M.L.A., H. R. Bousfield, W. G. Brown, C. Henwood, J. Livingston, John Nicol, C.M.G., H. H. Puntan, R. H. Wisely, V. Seymour, H. Sparks. Secretary: John Morley. Committee: J. Ellis Brown, J. Burman, C. A. L. Bull, D. Doyle, Samuel Deane, James Henderson, W. Konigkramer, W. D. Kimber, W. J. Mirrlees, W. Milne, J. Swales, W. J. Thompson, C. Wilson, Wilfred Payne, Wallis Short, S. T. Amos, J. McBride, F. M. Hillier, W. A. Stocken, and W. A. Bath. Treasurer: Edwin Greenacre. Auditor: W. Murray Smith.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J H Colenbrander. President: J McIntosh. Vice-Presidents: H Westermeyer, R R McDonald. Committee: F R W Behmer, G Compton, H Freese, W Freese, W Gillitt, H W Konigkramer, H W Nichols, F Schaefermann. Hon Secretary and Treasurer: Frank J Volek.

EMPANGENI AND DISTRICT SUGAR PLANTERS' AND FARMERS' ASSOCIATION.—President: Col. C. B. Addison. Vice-President: P. Stott. Secretary and Treasurer: F. Piccione, P.O. Empangeni. Executive: P. Addison, G. Higgs, — Salvesson, — Blake.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J R Pennefather. Vice-President: C F Adams. Secretary: T Parkins. Treasurer: W T Brockwell.

GOURTON FARMERS' ASSOCIATION.—Chairman: M Sandison. Vice-Chairman: R Gray. Hon Secretary and Treasurer: Frederick B Burnard, Highfield P.O. Committee: Dr Landon, J.P., E Reed, J Woods, C van der Merwe.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: A W Smallie. Vice-President: Thos Brookes. Hon Secretary and Treasurer: R J Hearn. Committee: G Queddon, N Glutz, Wm Craig, W R Qusted, W T Heslop, Thos Dewar, A E Norman, D P Campbell, J J Grove, H J Hearn, D W H Tandy, J B Pendar, J Campbell, J Barbour.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C Gold, Dartford, Underberg. Vice-Presidents: F E Peto, G H Royston, J B Nicholson. Hon Secretary and Treasurer: G Palframan, Watermead, Underberg. Executive Committee: G Malcolm, W S Johnston, P McKenzie, F E Peto, J S Gordon. Yard Steward: D T Malcolm. Auditors: T C Dearlove and F E Peto.

HOWICK FARMERS' ASSOCIATION. — Chairman: Thos Morton. Vice-Chairman: M A Sutton. Hon Secretary and Treasurer: A Clark.

INGOGO FARMERS' ASSOCIATION.—President: E. W. Noyce. Vice-Presidents: G. A. Fimstone and D. A. Drummond. Hon Secretary and Treasurer: C. Drummond.

IXOPO AGRICULTURAL SOCIETY.—President: F L Thring, J.P. Vice-Presidents: Col W Arnott, B.M.R., W K Anderson, J.P., C E Hancock, J.P. Committee: John Anderson, Thos Allen, J C Auld, H D Archibald, F S Beningsfield, S Boyd, T L Clarence, F E Foxon, R.M., Wm Foster, Jas T Foster, C C Foster, Geo E Francis, L Gray, A M Greer, J.P., J R Greer, Wm Gold, H A Hill, C F Harris, A E Keith, R Kennedy, Geo Martin, W Oakes, L J Phipps, T F Remfry, J W Robinson, Jas Schofield, M.L.A., D C Smail, A Stone, W R Way, A H Walker, M.L.A., P D Webb. Hon Secretary: G C Way, Hon Assistant Secretary: A G Harris. Hon Treasurer: T Arnott.

IXOPO FARMERS' ASSOCIATION.—President: C. E. Hancock, J.P. Vice-Presidents: T. F. Remfry and R. Vause. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: Col. Arnott and T. F. Remfry, with W. D. Campbell as reserve. Committee: John Anderson, W. Oakes, D. Campbell, G. C. Way, James Foster, A. Keith, G. Martin, F. Z. Thring, A. C. Kirkman.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Daniel Bester, Vice-Presidents: Herman Illing, J G Bester, Wm A Illing. Secretary and Treasurer: Edward V Bambrick (Box 90, Ladysmith). Executive Committee: A Brink, J Farquhar, C.M.G., M.L.A., W C Hattingh, J G Hyde, Trev Hyde, A I Horsley, W Freer, L A Leonard, H Nicholson, H C Thornhill, Herman Illing, D Munger, P de Waal, J H Newton, D Sparks, J.P., J T Francis, A W (Gus) Illing, G Pinkney, W Cochrane, George L Coventry, and *ex officio* officers.

KRANTZKOP FARMERS' ASSOCIATION.—President: Capt M Landsberg. Vice-President: P R Vermaak. Hon Secretary and Treasurer: G T van Rooyen. Committee: C J van Rooyen (Albany), C J van Rooyen (Wonderfontein), J. A. G. Mare, L M van Rooyen, Jnr, R P Martens, J P Nel, Dr Proksch, and F E van Rooyen.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson. Vice-President: H Nisbet. Executive Committee: H Nisbet, M A Sutton, A J Holmes, J Humphries, Jno Pole, and W A Lawton. Auditor: W J R Harvard. Hon Secretary and Treasurer: Arthur F Dicks, P.O. Box 1, Howick.

LITTLE TUGELA FARMERS' ASSOCIATION.—President: F van de Waal. Vice-President: F G King. Secretary and Treasurer: H L Frances. Auditor: A D Buchanan. Committee: P R Summersgill, F W Holmes, J P Wepenaar, J J Harding, Max Cameron.

LOTENI FARMERS' ASSOCIATION.—President: J A Tod. Vice-President: T Carter. Hon Secretary: A Kennedy Stone.

LOWER TUGELA DIVISION ASSOCIATION.—President: W R Hindson. Vice-President: A E Foss. Hon Secretary and Treasurer: H Curtis Smith (Stanger). Committee: A S L Hulett, F Addison, G Stewart, T G Colenbrander.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D C Aiken, J.P. Vice-Presidents: H Albers and C H Mitchell, J.P. Hon Secretary and Treasurer: W J Plows. Committee: C Manning, J W Aiken, W G Camp, T F Godwin, J Hutton, H Norden and A Borchard. Hon Secretary, Show Committee: J W Aiken. Show Committee: A E Collison, A Borchard, F Knoop, A Ringo, H F Voigts, J Hutton, C Manning, A J Lugg and H Albers. Hon Auditor: J W Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: L G Wingfield-Stratford, J.P. Vice-Chairman: B B Evans. Hon Secretary: J W V Montgomery. Assistant Hon. Secretary: A L Wingfield. Hon Treasurer: Jos McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: R Garland. Vice-President: C B Lloyd. Hon Treasurer: H A Rohde. Collector: Capt W H Stevenson. Auditor: Claude Seott. Hon Secretary: H B Hall.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos Thresh. Vice-Presidents: Wm Lilje, E A Grantham. Secretary and Treasurer, C A Selling. Committee: Otto Rottecher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torage, T Braithwaite, Ernest Rottecher, C H Tilbrook, Rev H Rottecher (Hon Life Member).

NEWCASTLE.—President: F A R Johnstone, J.P. Vice-President: C Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O Schwikkard, C.M.G., Newcastle. Secretary: Wm Beardall. Treasurer: Ed Nicols. Executive Committee: L H S Jones, E Phillips, H C Caldecott, C Watson, G Langley, W A Lang, W J P Adendorff, J E de Wet, O Davis, S W Reynolds, B Pettigrew, G W Thomas, G H Bishop, H R Muir, M C Adendorff, W Napier, P Van Breda, Chriss Botha, G Templar.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: G C Mackenzie. Vice-Presidents: J C Watt, J.P., and R H Oellermann. Life Member: C A S Yonge, M.L.A. Secretary and Treasurer: W D Stewart, New Hanover. Auditor: J H F Hohls. Committee: W N Angus, E Bentley, W W Bentley, Edward Boast, E E Comins, G R Comins, C Crookes, jun, H Dinkelmann, J Duval,

W Fortmann, Dr C H Herbert, J Hillermann, J H F Hohls, H Jacobson, H A Light, G C Mackenzie, A F Mackenzie, T M Mackenzie, J Muirhead, J.P., Oswald Muirhead, G Moe, J.P., J Moe, O Moe, C Oellermann, F Oellermann, C J Oellermann, W Ortmann, J C Otto, E Peckham, J.P., J A Potterill, S Peckham, C M Scott, Rev J Scott, Wm Schroeder, J.P., Owen Solomon, J H Smith, Riby Smith, F Thole, H Vorwerk, H F Westbrook, W H Westbrook, C Westbrook, T Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P. Vice-Presidents: H Mummbrauer, P Roddehorst, W Dralle, W Wortmann. Committee: W Bartels, F Bosse, H Brammer, A J Bruyns, H Bruyns, Carl Dralle, H Gebers, W Gevers, J H Holley, jun, W C Holley, C Hillermann, L Koch, H Kohler, F E Kuhn, M Maister, H Mereis, A Meyer, H Meyer-Estorf, H W Meyer, K A Meyer, H Misselhorn, W Misselhorn, K Peters, I Potenhauer, G Rabe, G Reiche, Joh Reiche, W Rencken, H Rosenbrock, H Schmidt, K Schmidt, Rev Jas Scott, K Seele, F J Smith, J Thies, W Witthoft, P Worthmann, A Worthmann, F Worthmann, H Worthmann. Secretary: Paul Vietzen, P.O., Singletree. Hon Treasurer: E Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: B. Greene Vice-President: Geo Ross. Secretary and Treasurer: C J King, Nottingham Road. Hon Auditor: H Singleton.

PIETERMARITZBURGSCH BOEREN VEREENIGING.—President: D P Boshoff. Secretary: E G Jansen, 313, Loop Street, Maritzburg.

POLELA AGRICULTURAL AND HORTICULTURAL SOCIETY.—President: J Isbister. Vice-Presidents: W H Allwright, J F Alexander, and H Brown. Hon. Secretary and Treasurer: J Anderson Speak. Auditor: A Brown. Executive Committee: J Isbister, W H Allwright, J F Alexander, H Brown, H J Gazzard, G W Foster, J Anderson Speak. Hall Committee: W H Allwright, F Crossley, A Brown, with the trustees—J F Alexander, H E Mingey, and Geo Forder.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W P Payn, J W T Marwick, C O and J W McKenzie and Chas Nicholson. Hon Treasurer: R Nicholson. Hon Secretary: Cecil Williams. Committee: Evan Harries, R A McKenzie, H M Moyes, Thos Marwick, J C Nicholson, J W Flett, A W Cooper, J.P., J W Hammond, C E Simes, Tom McCrystal, and the seven office-bearers (*ex-officio*).

RICHMOND ROAD FARMERS' ASSOCIATION.—President: Thos Stead, J.P. Vice-President: W Mapstone. Secretary and Treasurer: W L Stead, New Leeds, P.O. Committee: D Malcolm, J Mapstone, W P Payne, J James, J Sinclair, W S Crouch, H B Boyd, W Middleton, W Oldfield, T E Horwood.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G M Sutton, K.C.M.G. Vice-Presidents: W S Crart, Jas King, D C Dick, G J Macfarlane, C.M.G., O Hosking, with His Worship the Mayor, *ex officio*. Secretaries, Treasurers and Collectors: Duff, Eadie & Co, 12, Timber Street, Pietermaritzburg. Yard Superintendent: H J Stirton. General Committee: T J Allison, W H Buchanan, F G Burchell, W H Cobley, P H Campbell, R Comins, W P Gough, E S Goodwill, K H Hathorn, K.C., T W J Hall, J Hall, L Line, Col Sir D Mackenzie, K.C.M.G., Jas Morton, Sir T K Murray, Jno Moon, W J O'Brien, P Otto, R H Pepworth, J F Potterill, A Robinson, Rev J Scott, P D Simmons, H Solomon, W L Stead, H J Stirton, Dr Oddin Taylor, F W Jameson S J Mason. Executive Committee: President, Vice-Presidents, and W J O'Brien, W H Cobley, K H Hathorn, K.C., and Col E M Greene. Members appointed by Corporation: Councillors Ireland, Sanders and Hathorn.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P J Kemp. Executive Committee: J J Uys, J Z Moolman, T J Botha, P J Viljoen, P J Kemp. Hon Secretary and Treasurer, Thys Uys, Utrecht P.O.

UMSINGA-BIGGARSBERG FARMERS' ASSOCIATION.—President: E C Nuss. Vice-President and Acting Secretary: Geo S Saunders, Helpmakaar.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T Menne. Vice-Presidents: Theunis J Nel, M.L.A., W J Slatter, W L'Estrange. Executive Committee: Tol Nel, A Newmarch, W Lilje, O Rottcher, S C Van Rooyen, W Newmarch, E J Van Rooyen, O Norton, I M Nel, J Browning. Managers of Show Yard: J M Handley and N Hunter. Hon Auditor: W K Ente. Secretary and Treasurer: W H Gibbs.

UMVOTI FARMERS' ASSOCIATION.—President: P R Botha (J's son),

Vice-President: J M Handley. Secretary and Treasurer: G E Cadle (Box 6, Greytown). Auditor: J M Nel. Committee: W J Slatter, J G Nel, H F Torlage, R J Landsberg, A Newmarch, P H van Rooyen, A F Handley.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: W L Oldacre. Vice-President: G Langley. Hon Secretary: W F B Sutherland.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L Viljoen. Vice-Chairman: B H Breytenbach. Members: I Bierman, M M Knight, J H Klopper, B C Hittingh, T Botha, M Gregory, P L Uys, H P Breytenbach. Secretary: G J Shawe.

UTRECHT BOEREN VEREENIGING.—President: D J A van der Spuy. Secretary: G J Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut-Col F Addison. Vice-Presidents: Sir Liege Hulett, Kt, M.L.A., W J Thompson, Esq, J.P., J Polkinghorne, Esq, M.L.A. Committee: Messrs W H B Addison, G S Armstrong, M.L.A., C Bishop, J.P., D Brown, sen, J.P., W Campbell, T C Colenbrander, A E Foss, J.P., A S L Hulett, J.P., J B Hulett, C Jackson, G Nicholson, J.P., T Polkinghorne, J W Perkins, J.P., E Saunders, J.P., G Stewart, and J H Stansell. Hon Secretary and Treasurer: H Curtis Smith (Stanger).

VRYHEID (WARD I.) AGRICULTURAL SOCIETY.—President: E Dalton. Vice-President: J F Potgieter. Secretary: F Kolbe. Assistant Secretary: H Lombaard. Committee: Secretary, Assistant Secretary, and A von Levetzow, T Ries, P Grobler, F Molman, A Steenkamp.

WEENEN AGRICULTURAL SOCIETY.—President: Allan Stuart. Vice-Presidents: R Garland, R H Ralfe, F I de Waal. Hon Treasurer: F C Schiever. Hon Secretary: E Cautherley. Auditor: S Wolff. Executive Committee: Hon H D Winter, M.L.A., J W Moor, M.L.A., D W Mackay, T H Hindle and L L'Estrange. Manager of Show Yard: S Vaughan. Assistant: A Clouston.

WEENEN COUNTY HORTICULTURAL SOCIETY: Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C J Offord, G W Linfoot, T J Nunn, Dr Brewitt, S Vaughan. Hon Secretary: F Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F W White. Vice-President: C E Symonds. Secretary: R H McAlister. Committee: Hon D C Uijs, A W Symonds, H T James, R J Ortlepp, J N R Dixon.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G H Hulett. Vice-President: C Hill. Hon Secretary and Treasurer: F Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the fund, Colonial Offices, Pietermaritzburg.

All correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Experiment Station Notices.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Chief Afforestation Officer, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes. Offers should be made in the first instance to the Chief Afforestation Officer, Cedara.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application to the Chief Afforestation Officer, Cedara.

CENTRAL EXPERIMENT FARM, CEDARA.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

As the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

In view of the fact that Parliament has refused to grant the necessary funds, the cost of railway tickets can no longer be borne by the Department of Agriculture.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

24th September, 1907.

W. A. DEANE, Minister of Agriculture.

MISCELLANEOUS REPRINTS, ETC.

- Black Spot . ("Letter Book Pages": reprinted from *Journal*.)
 Mealie Grubs (do do)
 Mosquitoes (do do)
 Woolly Aphis (do do)
 Cotton. By A. N. Pearson, Director, A. E. & C. (Reprinted from *Journal*: 1904.)
 Co-operation. By E. T. Mullens, Secretary, Minister of Agriculture. (Reprinted from *Journal*: 1907.)
 Citrus Fruit Export. (Reprinted from *Journal*: 1907.)
 Natal's Progress in 1906. (Reprinted from *Journal*: 1907.) The statistics contained in this paper are on the same lines as those in the Annual Reports for previous years of the Secretary, Minister of Agriculture.
 Natal's Progress in 1907. By H. J. Choles, F.S.S. (Reprinted from *Journal*: 1908).
 Fibre Cultivation. (Reprinted from *Journal*: 1907.) This paper is a summary of Bulletin No. 13 of the Department of the Interior, Bureau of Agriculture, Manila.
 Sisal, Mauritius Hemp and other "Aloe" Fibres. By T. R. Sim, F.L.S., Conservator of Forests. (Reprinted from *Journal*: 1907.)
 The Fibre Industry of Mauritius. By Leonard Acutt, J.P., Tongaat; Member of the Land Board, Natal. (Reprinted from *Journal*: 1907.)
 South African Products Exhibition, 1907. Report of T. R. Sim on the Natal Exhibits. (Reprinted from *Journal*: 1907.)
 Poplar Timber for the Local Manufacture of Matches. By E. R. Sawyer, Director, E.S. (Reprinted from *Journal*: 1908.)
 Agricultural Industries and Land Settlement in Natal. [1907.]
 Judging Fruit, Flowers, Plants and Vegetables at Shows. By T. R. Sim, F.L.S., Conservator of Forests. [1906.]
 Agricultural Statistics, Natal, 1905-6. [1907.]
 Model Rules for Agricultural Co-operative Societies. (*Price 1s., post free.*)

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| „ ORANGE RIVER COLONY .. | E. J. MACMILLAN, Government Buildings, Bloemfontein. |

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SCENE IN A WATTLE PLANTATION.

The Natal Agricultural Journal.

The Oversea Meat Market.

IN our December issue we referred at some length to the possibilities that Natal has in the way of exporting mutton oversea. We drew attention to the fact that the number of sheep in the country—not only in Natal but in the other Colonies of South Africa—was increasing steadily, and that, consequently, we must either export our mutton or have the price of meat fall ruinously at a no very distant date; and the sooner we realise this and appreciate the situation the better. We also gave some advice with regard to breeding, pointing out that breeding along scientific lines—and not only breeding but feeding also—was essential if we were to make a success of the export trade. We must breed for quality—we must breed to suit the requirements of the market oversea which we wish to tap,—and we must feed our animals in the most scientific way, rapidly, without any check in their development. These are the two main points in the whole question, and success will depend upon the degree of thoroughness with which we carry scientific theory in these matters into practice.

In our present issue we print an “interview” with Mr. Henry S. Fitter, of the well-known Smithfield firm of Henry S. Fitter & Sons, which should be carefully perused and studied by every sheep-farmer in the Colony. This “interview” is full of information of the most interesting character to us at the present time, and indeed points the way which we must follow if we wish to make a success of our meat export. A careful perusal of the “interview” elicits the following main points, which we print herewith for our readers’ convenience:—

1. Lamb is more acceptable to the British consumer than mutton. It is not only tender, but its flavour is attractive.
2. The really prime mutton trade is not making any headway.
3. A first cross of Southdowns with (presumably) merinos is about the best as regards breed.
4. The best lamb is the one that has been the most rapidly grown, maturing at a weight of anything under 36 lbs., but not more than 40 lbs.

The lambs must, however, not be weedy. If they are weedy they ought rather to be over these weights.

5. There must not be too much fat on the lambs. This is more likely to occur in the heavier lambs than in the smaller ones. A lamb weighing 40 lbs. might easily carry 4 lbs. of fat, with the kidney itself weighed in. This should be left out. The total weight would be only 36 lbs. but the price per lb. would be better.

6. The earlier lambs are shipped the better; the end of September or beginning of October would not be too early. "There is always keen competition for the first shipment."

7. Merino mutton can be sold in London, but the market is ruled by River Plate mutton. Prices have been 3d. to 3½d., but there is a tendency to improve. Fifty to fifty-five pounds is a useful weight.

These are the main points, and from a study of these points we get down to the following bed-rock facts, *viz.*: (1) We must export lambs under 40 lbs. in preference to mutton; (2) we must give attention to breeding—Southdowns are about the best, crossed with merinos; and (3) the lambs must be lean and rapidly grown. These, it will be seen, are the very points to which we called our readers' attention in our December number. They show—and the whole "interview" shows—that breeding and feeding are the two great requirements to which we must give attention if we wish to make our mutton export a success.

In connection with the subject of mutton export, Messrs. W. Weddel & Co.'s "Review of the Frozen Meat Trade, 1908," a copy of which has been received from the Commercial Agent for Natal in London, is of interest, whilst it also contains useful information relative to the beef trade. We are unable to give a summary of this "Review" in the present issue, owing to pressure upon our space, but we hope to go into the main points of interest discussed by Messrs. Weddel & Co. next month. We may, however, glance here at the interesting diagrams issued by Messrs. Weddel & Co. supplementary to their "Review." These charts, which are four in number, show: (a) Yearly Averages of Top Prices of Frozen Meat at Smithfield Market, 1889 to 1908; (b) Fluctuations in Values at Smithfield Market, 1908; (c) Yearly Importations of Frozen Beef, Mutton and Lamb into the U.K., 1889 to 1908; and (d) Quantities of Frozen Beef, Lamb and Mutton imported monthly into the U.K. during 1908.

The second of these charts is of particular interest. A study of this chart shows that the top prices of prime Australian lamb remained at 5d. from the beginning of the year until May 8th, when it fell to 4½d. On June 26th it was back again at 5d., remaining there until July 10th, after which it rose an eighth of a penny, falling again, however, to 5d. on the 24th of the same month, at which level it remained until October 9th. On the 16th October it was down to 4½d., rising

again to 5d. on the 23rd and to 5½d. on the 30th. On the 13th November it was back again at 5d., where it remained for the rest of the year.

New Zealand mutton had a more varied time. The year opened with the price at 5½d. per lb. (top price for prime quality, as before: all prices on this chart are highest prices obtained for the best quality on the Smithfield market). The price remained at this level until the end of January, when it rose suddenly to 6¼d. on February 7th. On the 14th it was 6½d., remaining so until the 28th. On the 6th March it was 6¼d. again, and then commenced to fall—6½d. on the 13th, 6d. on the 20th, and 5½d. on the 27th. At this point it paused until the 16th April; by the 24th it was down to 5¾d.; and on the 15th May it was 5½d. The price kept at this level until the end of June, rising to 5¾d. on the 3rd of July, but falling back to 5½d. the following week. From the 31st July till the 4th December the price was 5½d., on the 11th September 5½d., on the 18th and 25th September and the 2nd October 5½d. again, on the 9th and 16th October 5½d., on the 23rd until the 6th of the following month 5¾d., on the 13th 5½d., and on the 20th 5½d., at which level it remained until the close of the year.

Australian mutton opened in January at 2½d. per lb. For the greater part of January and during the first week in February the price stood at 2¾d., after which it gradually rose—practically week by week—to 3¾d. at the beginning of April. At the beginning of June it was down to 3¾d., in the vicinity of which it remained, with an occasional fluctuation of an eighth of a penny, ending the year at 3d.

As in the case of lamb, New Zealand mutton showed more marked fluctuations. During the first week or so in January the price was 4d. per lb. Fluctuations then took place on the following dates: January 10th, 4½d.; January 31st, 4½d.; February 28th, 4½d.; 6th, 4¾d.; 13th, 4½d.; 20th, 4¾d.; 27th, 4½d.; April 3rd, 4½d.; May 8th, 4¾d.; 22nd, 4½d.; June 26th, 4½d.; August 14th, 4¾d.; September 11th, 4½d.; October 30th, 4½d.; November 6th, 4d.; 27th, 3½d.—to end of year.

The lowest weekly top price touched by River Plate prime mutton was 3d., from the 17th January to the 14th February; the highest was 3¾d., which ruled from the end of March till the 15th May. From the end of May until the end of November the price remained at 3½d.

The price of Scotch mutton, which we give as an interesting comparison, varied between 6d. and 8¼d. per lb. (top prices).

Of particular interest, also, is the fourth of Messrs. Weddel & Co.'s charts, showing the monthly importations of frozen beef, lamb and mutton into the United Kingdom during 1908. Space, however, does not permit of reference to this diagram, but in our next issue we shall publish a statement, compiled from the figures given in the chart, which will serve to show the distribution of imports of frozen meat into the United Kingdom throughout the year.

Belgium and S.A. Wool.

MANY will be surprised to hear that, at the present moment, nearly a quarter of the wool production of South Africa is finally sold at Antwerp. Out of 287,000 bales, exported from this sub-continent in 1907, about 67,000 were imported into Belgium. The following table shows the annual increase of the commerce in Cape wool (this is the name given on the Continent to wool of South African origin) :—

IMPORTS INTO BELGIUM OF CAPE WOOL.

1896	...	...	...	...	10,000 bales
1897	...	...	...	...	9,000 „
1898	...	...	...	...	12,000 „
1899	...	...	...	...	24,000 „
1900	...	...	...	...	16,000 „
1901	...	...	...	...	16,000 „
1902	...	...	...	...	16,000 „
1903	...	...	...	...	23,000 „
1904	...	...	...	...	28,000 „
1905	...	...	...	...	43,000 „
1906	...	...	...	...	51,000 „
1907	...	...	...	...	67,000 „

Thus, since 1902, *i.e.*, since the definite re-establishment of peace in South Africa, progress has been rapid and continuous.

True, the geographical situation of Antwerp lends itself admirably to a great development of the commerce of Cape wool. This port has, in that respect, almost unique advantages, being situated at the door of the greatest wool centres of Occidental Europe. In the first place there is Verviers, at present one of the largest consumers of Cape wool on the Continent, receiving *via* Antwerp large quantities every year. Then there is Tourcoing, the important manufacturing centre of the North of France. (Here Cape wool can enter free of duty, without payment of warehouse surcharge.) There are also the wool centres of the Prussian Rhineland, of Southern Germany, and of Switzerland.

Like London, Antwerp annually holds six series of public sales, at previously fixed periods. These have been arranged for 1909 as follows:

The 1st series in the week commencing 11th January			
The 2nd	do	do	1st March
The 3rd	do	do	26th April
The 4th	do	do	28th June
The 5th	do	do	13th September
The 6th	do	do	15th November

At these sales wool of every origin is sold: Argentine (in enormous quantities), Australian, South African, etc.

At each several meetings are generally convened, which are attended by numerous comb-spinners and card-spinners, combers and merchants of different countries. There is no doubt that larger consignments of Cape wool would be received with great interest on the Antwerp market, and the prices obtained compare favourably with those paid on other markets.

In addition to these public sales many hand-to-hand transactions take place by private contract.

Several Antwerp houses are already representing wool-firms in Cape-town, Port Elizabeth, East London, Kingwilliamstown and Durban, and a large and important business is carried on between them. The Belgian Consulate in Johannesburg—to whose courtesy we are indebted for the facts contained in this article—has, at the disposal of those interested, a list of first-class Antwerp firms, who have stated that they are willing to receive consignments of Cape wool, making the usual advances and supplying the best guarantees.

The wool community of Antwerp, very powerful on account of their number and extensive relations in the principal consuming centres of Europe, view with great favour the importation of Cape wool, the sale of which they are anxious to promote as much as possible.

It is customary in Antwerp to sell wool against cash payments on removal. At the same time we may state that the costs of handling, storing and insuring at Antwerp are reduced to a minimum; in fact they are considered the lowest in Europe. Thus, besides the advances given, the consignor is sure to receive a considerable balance with very little delay.

The numerous and regular maritime communications between Antwerp and all other ports of the world are well known. Several lines of steamers directly connect Antwerp with South Africa, and local exporters will never experience any difficulty in sending their wool *direct* to Antwerp.

In short, from an impartial inquiry into the conditions pertaining to the Antwerp market, it appears that it would be to the advantage of South African wool-producers to give Antwerp a fair trial. It is only by practical trials that the real value of a market can be ascertained, and as regards Antwerp, such trial will doubtless prove profitable.

An ample supply of water should be provided for cooling milk and cream, washing the butter and for cleansing purposes generally.

The Maize Crop in February.

DURING the month of February the average condition of the maize crop throughout the Colony was very slightly lowered, as a result of excessive rains. In our last issue we announced that the condition of the crop on the 31st January was 3·1, or very slightly above the average of the preceding five years. This gave a yield of 5·34 muids to the acre—or a total crop of 886,000 muids. According to the information we have received, we calculate that the condition of the crop on the 28th February was just 3·0—that is to say, an average crop on the basis of the preceding five years. This gives us a yield of 5·16 muids to the acre, or a total crop of about 856,000 muids. This is 30,000 muids less than what we estimated last month, and 76,000 muids more than we estimated in January.

Using the figures 1, 2, 3 and 4 to represent the conditions “Poor,” “Fair,” “Average” and “Above the Average,” we have prepared the following comparative statement, which will doubtless prove of interest to the reader, as showing the progress or otherwise the crop is making in each of the Magisterial Divisions of the Colony. We may again, however, first of all explain our method a little more clearly, taking the condition represented by the figures 2·7 as an example. The figure “2,” it will be remembered, represents the condition described as “Fair,” whilst “3” represents “Average” condition. Thus 2·7 will represent an *average* condition of from “Fair” to “Average,” but a little nearer “Average” than “Fair.” This does not mean, of course, that all the crops in that Division may be described as 2·7 in condition. In fact, it may easily be that not a single field is of such condition. The meaning is that, taking the crops as a *whole*, their condition is something a little more than midway between “fair” and “average.”

CONDITION OF CROP.

(Note.—A condition “above the average” is represented by the figure 4; “average” by the figure 3; “fair” by the figure 2; and “poor” by the figure 1: intermediate figures represent corresponding conditions.)

Division.	Condition of Crop at End of—		
	December.	January.	February.
Lower Umzimkulu	2·7	3·0	2·7
Alexandra	2·5	4·0	4·0
Umlazi	3·0	3·0	3·0
Inanda and Indwedwe	3·0	4·0	3·0
Lower Tugela and Mapumulo	2·0	4·0	3·0
Impendhle	3·0	3·0	3·0
Alfred	3·0	4·0	3·4

CONDITION OF CROP—*Continued.*

Division.	Condition of Crop at End of—		
	December.	January.	February.
Ixopo ...	2'4	4'25	3'5
Richmond ...	2'5	3'0	3'0
Umgeni' ...	3'0	3'5	4'0
New Hanover ...	2'0	2'75	2'4
Lion's River ...	3'0	3'0	2'5
Umvoti ...	3'7	3'2	3'2
Krantzkop ...	3'0	2'0	4'0
Underberg ...	4'0	3'0	2'4
Polela ...	3'0	4'0	4'0
Bergville ...	3'0	2'7	2'0
Estcourt ...	2'7	2'9	2'5
Weenen ...	3'0	2'0	2'0
Klip River ...	2'8	2'6	2'75
Umsinga ...	2'0	2'5	3'0
Dundee ...	2'0	1'7	2'0
Newcastle ...	3'0	2'9	2'8
Vryheid and Ngotshe ...	2'5	2'0	3'0
Utrecht ...	—	4'0	3'0
Eshowe and Mtunzini ...	3'0	2'5	3'0
Emtonjaneni ...	2'0	3'4	3'4

The figures in this statement show how the crop has been faring, month by month, in the different Magisterial Divisions. It may be of interest also to note that the average condition of the crop on the Coast belt at the end of February was 3·5, in the Midland belt 3·3 and in the Upland belt 2·6.

Fright is as disastrous for a hen as for a cow. Be gentle around the flock.

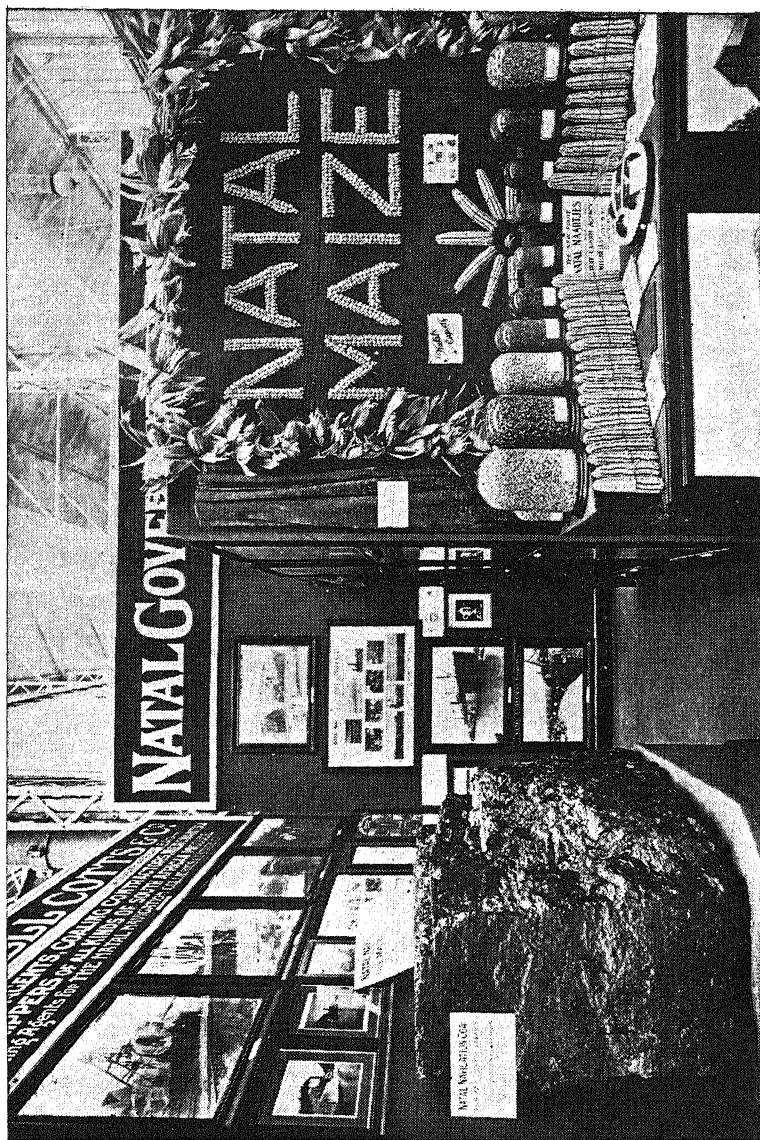
As a result of numerous complaints which have been received by the Railway Department in connection with the delays to, and loss of, returned empty milk cans, the following regulations are to be brought into operation over all the South African Railway Administrations from May 1st, 1909:—(1) All milk cans must have the owner's name and the station from which the milk will be despatched indented thereon or the milk will not be accepted for conveyance. (2) Empty milk cans will only be returned to the consignee and station shown on the cans, no matter to whom consigned by the senders.



European Boys on Farms.

IN our January issue we announced the formation, by direction of the Hon. W. A. Deane, Minister of Agriculture, of a Farm Apprentices' Bureau, under the control of the Editor of the *Natal Agricultural Journal*. Since the appearance of that issue a similar announcement, intended to reach the parents of boys in the towns, has been made through the columns of the daily press; and we are glad to see that the idea is being supported by the newspapers themselves. We trust that farmers will take up this idea and give it the support which it deserves.

The crying need of Natal at the present time—and indeed the chief requirement of all young countries—is fresh settlers. We want more and more men on the land. Land is continually being thrown open by the Government, and opportunities for young men with energy and a practical knowledge of farming are continually offering themselves. We shall, for many, many years to come, need more men on the land: agriculture is the backbone of the country, and if the country is to progress we must strengthen that backbone. The Government is doing this in every conceivable and at the same time practicable way, and the present scheme for the drafting of town boys on to the farms is but one of the many steps which are being taken to strengthen the agricultural framework of the Colony. Whatever may be the political future of Natal—whether we throw in our lot with our friends of the Transvaal, Cape Colony, and Orange River Colony, or whether we stand alone, the need for fresh settlers will always be with us. We trust, therefore, that the farmers of Natal, so far as they are able, will help Mr. Deane in his present effort in the interests of the country, and, if they can give employment on fair terms to white boys on their farms, write to us and state their needs. Should these lines meet the eyes of any townspeople who have sons whom they would like to place on farms, we hope that they also will communicate with us.



NATAL AT THE FRANCO-BRITISH EXHIBITION.

(See "Notes and Comments.")

Held Over.

We regret that, owing to pressure upon our space this month, we are compelled to omit our usual "Exchange Reviews." Some of the notes of more general interest we have included in our "Notes and Comments."

Gum Disease of Citrus Trees.

"Gum Disease of Citrus Trees in California" is the title of Bulletin No. 200 of the Californian Agricultural Experiment Station. It appears that the most common or most characteristic citrus tree diseases in California are those which may be included under the general term "Gum Disease." To a certain extent the various forms of gum disease are serious, and yet they are by no means disastrous; their nature is in a sense unknown, and yet for practical purposes fairly well understood; their control is often difficult and by no means generally accomplished, yet almost always successfully attained when taken in time by proper means, when conditions impossible of improvement are not present. In short, gum disease is one of those conditions which require careful, continued, intelligent work along various simple lines for successful handling, rather than something of a strikingly specific nature with quick evidences of action and effect. It is also easier of prevention than of cure.

The bulletin before us considers the various citrus troubles which may be included in the category of gum diseases, showing the features which they have in common and discussing their nature, together with methods of prevention and cure. It appears that the production of gum is the almost constant accompaniment of any injury to or interference with the functions of the citrus trees. In the splitting of oranges, particularly the Navel, which is so abundant and destructive some seasons, a drop of hardened gum is invariably found just at the spot where the split in the tissue occurs. Whether this accumulation of gum is a cause of the effect of the splitting is difficult to determine. Indeed, in many oranges which do not split, but mature normally, drops of hardened gum can be found at the blossom end. The same is seen regularly in the saucer peach, grown commonly in Southern California. The leaves of oranges and other citrus trees often show a form of gumming, but not as an indication of any particular disease. In many cases, indeed, trees with such leaves are to all appearances entirely healthy. This gumming takes the form of a brown solid deposit in spots of pustules just beneath the surface. Trees which are affected with any injurious condition are likely to show this effect in the leaves, but, as just said, it is not always an indication of any trouble.

Experiments in Molasses Feeding.

The results of experiments carried out recently in Germany with the object of determining the amounts of molasses that may with advantage be fed to horses and cattle are worthy of notice in connection with our article on the subject of molasses feeding elsewhere in the present issue. For cattle it was found that six pounds of molasses per 1,000 pounds live weight is probably the maximum daily allowance that should be given, although eight pounds were fed without evil effects. Horses which were doing a considerable amount of work were fed with molasses with encouraging results, the ration being mixed in the proportion of seven and a half pounds of mealies, seven pounds of bran, and five pounds of molasses. It was noticed that on this diet horses perspired very little during hot weather. Even when 10 pounds of molasses per day were given to the horses, no evil effects were noticeable, but some difficulty was experienced in getting the animals accustomed to it.

Mealies and Legumes.

Reference is made in a recently issued Farmers' Bulletin of the U.S. Department of Agriculture to the advisability of planting legumes between the rows of mealies—a suggestion which has much to commend itself to Natal farmers. Maize requires a strong, well-tilled soil, and upon thin land, deteriorated by bad management, the yield soon drops below a remunerative average. Such lands will, however, as the Bulletin points out, profitably produce other crops of great value for the sustenance of a farm stock, and, in addition, the growing of these crops will provide an excellent means of soil renovation. "Lands that are now producing ten bushels of mealies per acre will, with much less labour, produce $1\frac{1}{4}$ tons of cowpea hay per acre, equal in nutritive value to thirty-one bushels of mealies, or they will yield $1\frac{1}{4}$ tons of peanut hay per acre, equal in nutritive value to $23\frac{3}{4}$ bushels of mealies, and in addition a peanut crop of 25 bushels per acre may be secured. On rich lands that under good culture will produce forty or more bushels of mealies per acre satisfactory results can be secured by planting cowpeas between the rows of mealies. Even rich bottom lands rated to yield 40 bushels of mealies per acre if sown to lucerne frequently produce five tons of hay per acre in a season, equal in feeding value to $105\frac{1}{2}$ bushels of mealies. In addition, such crops as cowpeas, peanuts, and lucerne rapidly enrich the soil and leave it in excellent mechanical condition for the ensuing year."

The Bulletin adds that, generally speaking, poor hill lands should not be used for mealie culture unless they are placed under a thorough system of renovation, or unless fertilization with stable manure or compost is practised to a high degree.

Tea-Growing.

We have received from the *Tropical Life* publishing department of Messrs. John Bale, Sons & Daniellson, Ltd., Oxford House, 83-91, Great Titchfield Street, London, W., a copy of an interesting and valuable booklet entitled "The Fertilization of Tea," by Mr. George A. Cowie, M.A., B.Sc. The book deals exhaustively with the question of the cultivation of tea on modern lines, the methods advocated being based on an extended series of experiments carried out by leading authorities who have long been recognised by tropical experts as fully competent to form trustworthy opinions as to what the tea-producing world requires to increase its *net* income and the best way to bring this about. The information given will certainly help any planter in his struggles with Nature, and any competitor to secure, at least, an equal footing with his strongest rival. No detail is missing so far as the care and cultivation of the plant are concerned.

After an opening chapter on the tea-plant, and tea-planting generally, the questions of pruning, soil, and the plant-foods necessary to secure good crops are carefully considered. Green manuring has a prominent notice, and is followed by a chapter on artificial and chemical manures, and another on the best—*i.e.*, the most effective—and at the same time the safest and most economical methods of applying this useful adjunct to the daily meal of the tea-plant, which is drawn from the soil to such an extent that no planter can afford to pass over the matter of replenishing the rapidly exhausted supplies as quickly as they are absorbed by the plant and removed by the leaves that form the crop. Unlike cacao, a tea-crop returns nothing to the soil; what is picked is lost for ever, and must be replaced. Two chapters towards the end of the book treat of the many experiments that have been made to enable Mr. Cowie, the author of the book, and his fellow experts to ascertain the very best means of obtaining as large and as regular an output of tea as possible. Each method of fertilisation is brought forward, and discussed; the various experiments to ascertain their respective merits are then explained, and finally the book winds up with a chapter on fertilising mixtures that should enable every planter, no matter how obstinate his soil may prove to be in responding to his efforts to increase his crop, to find at least one mixture that will bring about the desired result. Whilst we recommend all interested in tea-growing to obtain a copy of this book, we have in the present issue reproduced a portion of the chapter on the manuring of tea which we think will be found of a special value by our readers, and which will give an idea as to the manner in which Mr. Cowie treats his subject. This is a very useful book, and will be found of value by all tea planters.

Poultry Industry in Denmark and Sweden.

The Department of Agriculture has received a copy of a recently-published report on "The Poultry Industry in Denmark and Sweden," by Mr. Edward Brown, F.L.S., the Secretary of the National Poultry Organisation Society. The report has been written as a result of a tour undertaken with the object of studying (1) the methods of production in Denmark, and how far these are associated with general farm operations or by means of special establishments; (2) the possibilities of increase in the already large supplies of eggs received into the United Kingdom from that country, and whether these are likely to grow to the same extent as in the past; (3) the aid afforded by central and local authorities as regards instruction and experimental work, and directly in improvement of the breeds of poultry kept, also in securing markets for the produce; (4) to examine into the methods adopted by societies formed for the encouragement of poultry-breeding in the country; (5) to learn the working of the various Co-operative Egg Associations established for the marketing of eggs, especially in regard to collection, grading, testing and packing, and the provision of the necessary capital for their operations, and also to what extent private firms or companies share in the trade done; (6) the system of preserving eggs, and how far it is adopted; (7) to discover, as far as possible, whether the production and fattening of table poultry is likely to extend, and to note whether the conditions are conducive to development of this branch of the industry; and in regard to Sweden (8) to find whether the increase of supplies of eggs, which has taken place within the past two or three years, may reasonably be expected to grow to the same extent as the Danish; and (9) what steps are adopted for encouraging the industry in that section of Scandinavia.

The report is divided into fourteen sections, dealing respectively with "Poultry Breeding in Denmark," "Breeding Centres in Denmark," "Methods of Housing in Denmark," "Egg Production in Denmark," "Hatching and Rearing in Denmark," "Table Poultry in Denmark," "Waterfowl and Turkeys in Denmark," "Marketing the Produce in Denmark," "General Notes on Denmark," "The Poultry Industry in Sweden," "Poultry Keeping in Sweden," "Marketing in Sweden," "General Notes on Sweden," and a summary, the report ending with a good index. The report covers a great deal of ground, and should prove valuable to co-operative societies as well as to all interested in the welfare of the poultry industry. Persons desirous of obtaining copies should write to Mr. Edward Brown, the Secretary of the National Poultry Organisation Society, Ltd., 12, Hanover Square, London, W. The price of the book is one shilling.

Enquiry for Wool Fat.

The Department of Agriculture has received from a Johannesburg firm an enquiry as to where wool fat may be purchased in Natal. The firm in question is prepared to purchase considerable quantities of this commodity for their grease factory if the right article can be obtained. We shall be glad to place any readers, who may be in a position to furnish this commodity, in communication with the firm.

East Coast Fever Regulations.

By Government Notice No. 129, 1909, dated the 11th March, the Minister of Agriculture has declared the following zones—which have been marked off with flags—to be zones within the meaning of the East Coast Fever Act, and has prohibited any cattle from entering or being in any such zone:—(1) Zone marked off with flags in the Zwaartkop Location along the boundary thereof; (2) Zone marked off with flags along the north bank of the Umkomaas River, in Durban County, from the sea to the fence between Umlazi Location and the Mid-Illovo district, thence in the Umlazi Location along the Divisional fence between Durban County and Camperdown Division to Stony Hill Road; (3) Zone marked off with flags in the Umvoti and Inanda Locations along the boundaries thereof from the farm Emtonjeni, in the Krantzkop Division, to the Umgeni River.

By Government Notices Nos. 120 and 131, respectively, the Minister has ordered that from and after the 1st April, no movement of cattle shall be allowed within that portion of the Magisterial Division of Estcourt which lies to the west of the main line of railway, and that from and after the 20th March, no movement of cattle shall be allowed within the Magisterial Division of Ixopo. Notwithstanding these prohibitions, however, healthy cattle may be moved from one place to another within the portion in question of the Estcourt Division, in the one case, and from one place to another in the Ixopo Division, in the other case, for immediate slaughter on permit granted by a member of the Advisory Committee for the Division, or by a person appointed by the Committee as a Permit Officer, and such removal shall be made within the time and according to the directions contained in the permit, and not otherwise. Permits for the removal of slaughter cattle by rail from any railway station in the Division must be obtained from the Minister of Agriculture, and will be issued subject to such conditions as he may see fit to impose. In terms of Act No. 32, 1903, any person disobeying these orders is liable to a fine not exceeding £100, or to imprisonment, with or without hard labour, and with or without the option of a fine, for any term not exceeding six months.

In terms of Section 3 of Act No. 54, 1906, the Minister of Agriculture has declared that the farms "Gundy Cleugh," "Lot A of Warwick," and "Lot B of Warwick," in the Klip River Division, shall, for the purpose of the East Coast Fever Acts, be deemed to be a portion of the Magisterial Division of Newcastle, and all restrictions or regulations which now or hereafter may be in force in the Magisterial Division of Newcastle shall, in like manner, be in force as regards the said farms. The Minister has also cancelled Government Notice No. 691, 1908, whereby he ordered that all cattle on certain farms in the Impendhile Division were to be forthwith branded "I.D." on the left shoulder.

Wattle Bark for Canada.

A Cape paper—the name of which we are unable to give, but for the reference to which we are indebted to the *Natal Advertiser*, has the following in a recent issue:—"An effort is being made to work up an export trade from Durban to Canadian ports. Some years ago a Canadian Trade Commissioner visited Durban for this purpose, but beyond the direct outward service which the Elder-Dempster Canada-Cape Line carries on he was not able to arrange for a direct service back, owing to the want of return cargo. Now comes a demand from Canada for wattle bark. At present the Dominion is supplied principally with mangrove bark, some of which is brought from East African ports by small coasters and shipped at Delagoa Bay. Natal wattle bark, however, has been found by Canadians to be much superior to mangrove bark, and, as leather manufacture has greatly increased of late years, there is almost an illimitable market for wattle in Canada. One of the Canada-Cape liners is going on berth shortly at Durban to load wattle, and further efforts are to be made to also send a shipment of mealies. Already a considerable quantity of the latter has been exported to the Dominion for seed purposes. It is thought also that some of the hardier kinds of Natal fruit might be exported to Canada during the off-fruit season there."

Here is pleasant news, alike for the wattle grower and the mealie grower—but particularly for the former. If, as is stated, "the Dominion is supplied principally with mangrove bark, some of which is brought from East African ports," there is not the slightest reason apparent why Natal should not compete, with her wattle bark, particularly as our bark appears to be preferred by the Canadian tanners. We may even see an extension of this trade to the United States. The United States tanners at the present time use extract to a very large extent, we believe, but if the Canadian find the use of wattle bark in its natural state profitable we can hardly see why, later on, when it is better known, our bark should not be used in the States also.

Railway Rates for Milk and Cream.

Farmers will welcome the reduction in the railway for South African milk and cream which is being made by the General Manager of Railways. The new rates, which are to come into force on the 1st April, are as follows: From 1 to 25 miles' journey, $\frac{1}{2}$ d. per gallon; 26 to 50 miles, 1d. per gallon; 51 to 75 miles, $1\frac{1}{2}$ d. per gallon; 76 to 100 miles, $1\frac{1}{2}$ d. per gallon: minimum charge, 3d. This traffic is "station to station," at owner's risk; and charges must be prepaid.

Natal at the Franco-British Exhibition.

At the recent Franco-British Exhibition in London, Natal put up a very attractive stand, the design and all the arrangements being carried out by the Colony's indefatigable Commercial Agent, Mr. C. W. Francis Harrison. Messrs. W. Cotts & Co., of Durban, through their London office, also did a great deal in the direction of advertising the Colony by incorporating a private stand with that of the Commercial Agent, and they were, we understand, responsible for the very attractive display shown in the photo which we reproduce in this issue. Messrs. Cotts & Co. displayed fifteen different samples of grain, a special display of Natal maize on the stalk and in cob; samples of Natal wattle bark on the trees, stripped and chopped; specimens of Natal naartjes, and samples of Natal Navigation coal. The display was highly important to all South African farmers as proving the high standard of excellence of South African grain, as this firm secured the highest possible award, the *Grand Prix*, for the following: (a) Natal Maize and Kafir Corn (Dari); (b) O.R.C. Wheat, Oats, Barley and Rye. This should encourage all farmers to put forward greater efforts, not only to produce more grain, but to improve the standard of it.

The further awards were: (a) A Gold Medal for Natal Wattle Bark; (b) a Bronze Medal for Natal Fruit; (c) a Silver Medal for Natal Coal. The Natal grain samples were from the following well-known growers and prize-winners at the 1908 Durban Show, *viz.*: Mr. John Moon, Manderston (White Hickory King Maize); Mr. R. S. MacNaughton, Cato Ridge (White Hickory King Maize on cob); Mr. J. W. Flett, Richmond (Yellow Hickory King Maize and cobs); Mr. F. J. Quedsted, Ladysmith (Kafir Corn); Harden Heights Wattle Co. (Wattle Bark). The O.R.C. samples were mainly supplied by Chas. Stevens, Schuttendraai, O.R.C. We recommend all farmers to write for a copy of the pamphlet on Maize Export, which is printed both in English and Dutch, by Messrs. Wm. Cotts & Co.

the proportions of protein and carbohydrates (which latter consist of nitrogen-free extract and fibre). Foods that are rich in protein are spoken of as nitrogenous foods, and they are also sometimes called albuminoids. Protein supplies the materials that are required for building up lean flesh, blood, muscles, skin, hair, horns, wool, nerves, tendons, the casein and albumen in milk, etc. The carbohydrates are, on the other hand, heat producing substances, being composed of carbon, oxygen and hydrogen. Now we find on reference to a table published by the Orange Judd Company of New York that lucerne contains 14.3 per cent. of protein, of which 10.6 per cent. is digestible, whilst mealies contain about 10.5 per cent., of which 7.9 per cent. only is digestible. Of nitrogen-free extract lucerne contains 42.7 per cent., of which 29 per cent. is digestible, whilst mealies contain 69.6 per cent., of which as much as 63.3 per cent. is digestible; taking the nitrogen-free extract and fibre together we find that in the case of lucerne only a little over 40 per cent. is digestible as compared with 64.2 per cent. in the case of mealies. From these figures it will be seen that lucerne is richer in flesh-forming substances than mealies, and that, on the other hand, mealies contain a larger proportion of heat and fat-producing substances. The natural conclusion would appear to be for farmers here to feed less maize and more nitrogenous foods, such as lucerne.

Lucerne grows so well and over so wide an area in Natal that it is surprising that our farmers have done so little in the way of feeding lucerne to their pigs. The pig industry will, in the no very distant future, be an important branch of farm activity; and as in all other branches of livestock farming, the best efforts in feeding produce the best financial returns in the long run. Consequently I would advise farmers to consider seriously the claims made on behalf of this important crop for the feeding of pigs, and then to experiment with a small patch and a few pigs, comparing the results with pigs fed in the ordinary way. It will give comparatively little trouble, and from what we have seen the results will probably be everything that could be desired. At the same time, I would be glad to have, for publication, the experiences of any of our farmers who have been progressive enough already to try this feed for their pigs, so that others may know its value, especially from a financial point of view, under Natal conditions.

In an excellent paper, read by Dr. De Wolf before the Kansas State Swine-Breeders' meeting recently, the lecturer discussed a lucerne-fed load of hogs that passed before him for inspection, in the following enthusiastic terms:—"As these lucerne hogs came down the alley to the scales, they were certainly hogs for the packer, raised at a profit—thrifty and ready to yield good-grade pork, for a good price was realised. You could notice that they were well up on their expanded feet; their height, length, and bones all rounded out with even fat, covered with a glossy, glistening,

heavy coat of hair, and keen eyes alert. Their backs were straight, broad, and well curved into long, deep sides that had plump, pointed, even-shaped hams at one end and arched shoulders at the other.

"On *post-mortem* we did not find a single parasite in livers, lungs, kidneys or intestines, as we do in hogs grown on mealies and cereals. Their lungs remained expanded, that is, inflated, when cast down in the gut chute, did not collapse, and were of a perfect pink. Their stomachs were larger and did not recoil or contract readily, and same was observed of the whole intestinal tube.

"The men who pulled the intestines from the ruffle fat for casings said, 'They are as tough as clothes-lines and as large as broomsticks.' The bung-gut cutter said that 'it seemed like taking out automobile tyres, and I have not cut or torn a single one, they are so tough.' The caul fat and ruffle fat after guts were drawn off were much heavier than the average in corresponding mealie-fed hogs. The leaf-lard puller and ham facers complained about so much fat and weight in lifting the leaf out, and it was more bound down to the inside of the abdominal walls. The splitter of backbones and sawyer of the stanks said 'it was like cutting iron or railroad rails.' All bones were bones, large and strong. The carcasses were symmetrically filled out like barrels, having funnel legs, and all front feet were stiff and rigid, straight out, while in other hogs the front feet are generally limp and dangling.

"Their skins were well filled, shining and smooth as the human. When I read this sentence to Mr. Hodgins he laughed and said, 'Don't credit it to lucerne, for we dip our hogs every two weeks in two or three inches of crude oil and never know what lice, mange or scurf are, nor hog-cholera so far, while our neighbours on all sides of us have had it and laid it down to tankage. We fed the same tankage they did, for we bought it from the same parties and at the same time.' Their bodies were solid and the meat was of that marble appearance of lean and fat, for the fat of a lucerne hog is whiter, and here is where we get the two strips of lean in the bacon—rustling for a living makes muscle.

"As we stood and looked up the slaughtering rail they looked like birds, each representing a \$20 (£4 3s. 4d.) eagle, and as large as rhinoceroses. Wonderful is a lucerne field for this species of thick-skinned animals—the American rhinoceros bird."

At the Kansas Station some years ago a gain of 800 lbs. of pork was made from a ton of lucerne, and a little less than that amount of gain was made from an acre of lucerne pasture. In a later experiment it was found that 100 lbs. of lucerne hay saved 96 lbs. of mealies. Calculating on the basis of 5 lbs. of mealies producing 1 lb. of pork, the 96 lbs. of lucerne would produce 19 lbs. of pork. Estimating the average yield of lucerne to be 4 tons per acre, on this basis it would mean a production of 1,600 lbs. of pork per acre with lucerne fed in the form of hay in con-

nection with mealies. This experiment was conducted during the winter season.

In an experiment during the summer it was found that 170 lbs. of green lucerne, cut and fed to pigs fresh in a dry yard, was equal to 100 lbs. of mealies, and in this experiment it took 6 lbs. of mealies to produce 1 lb. of pork. Therefore, assuming 170 lbs. of green lucerne would produce 16 2-3rd lbs. of pork, a fraction over 10 lbs. of green lucerne would produce 1 lb. of pork. Estimating that an acre of lucerne will yield during the season 20,000 lbs. of green hay, this experiment would show that such an acre of lucerne, cut green and fed fresh, would produce something like 2,000 lbs. of pork. Of course, this is fed in connection with mealies, and a statement that an acre of green lucerne would produce 2,000 lbs. of pork would be very misleading. Figuring on the basis of these two experiments, lucerne hay yielding four tons per acre (8,000 lbs.) would produce 1,600 lbs. of pork, and with green lucerne producing ten tons per acre (20,000 lbs.) would produce 2,000 lbs. of pork.

According to Professor Coburn, a Finney County, Kansas, farmer reports having pastured 30 pigs on one acre of lucerne from May 1st to September 1st, when they weighed 100 lbs. each and were in fine condition for fattening. Another Kansas farmer reports keeping 100 pigs from about the middle of April to September on five acres of lucerne pasture. A little grain during the last two months would have gained him many pounds of pork. Many lucerne-raising pig-growers insist that their pigs can be maintained from May to October on lucerne for one-half what it would cost for almost any other feed.

The Utah Station found that young sheats gained one-third of a pound a day on lucerne pasture without grain. But the station found also that the gain was not so great in older pigs. A Wisconsin dairyman reported that he kept nine sows all winter and spring on lucerne hay and skim milk, without any grain, and raised from them 75 pigs, all healthy and vigorous.

The Colorado Station considers that a ration of three-fourths mealies and one-fourth lucerne hay is the best for fattening hogs for market, but for young hogs not ready for fattening the proportions should be reversed. The station does not recommend grinding lucerne hay for hogs, probably on the theory that the hog's time is not worth much at best.

It appears that it is specially important that lucerne intended to be fed to pigs should be cut early. "For fattening hogs it is well to feed about one ton of well-cured alfalfa hay with each 250 bushels of grain." (Coburn.)

Farmers' Bulletin No. 215 of the U.S. Department of Agriculture considers that lucerne is an ideal pasture plant for pigs. "There is no danger from bloat and with a limited number of hogs there is practically

no injury to the lucerne field. Vigorous lucerne will support 15 to 25 head of pigs per acre. It is best to limit the number of pigs to that which will be insufficient to keep down a lucerne field. Cuttings of hay may then be made at intervals and the growth thus rejuvenated. On the average pigs weighing from 30 to 60 pounds in the spring will make a gain of about 100 lbs. each during the season. Although pigs may be grown and fattened upon lucerne alone, it is best to combine the lucerne with some kind of grain ration. Lucerne by itself is too rich in protein to give a balanced ration. Where pigs are pastured upon lucerne alone they may be prepared for the market by feeding for a few weeks upon maize. It is still better, however, to feed a third to a half of a ration of corn or other grain during the time of pasturing."

In his "Book of Alfalfa," Professor Coburn quotes the following letter addressed to him by "one of the most extensive and successful swine raisers in Kansas":—"Twenty-five years of pasturing hogs of all ages on lucerne has proven conclusively to me that with a fourth to a half grain ration, while they are on such pasture, will produce in them a greater growth per day than when in dry lots on full feeds of mealies. Hogs will maintain a reasonable growth, but not fatten much, on lucerne pasture alone. I believe it profitable to feed them some grain while running on green lucerne. If it is desired to full-feed hogs, they will make a rapid fattening by increasing the grain ration while on the pasture, and with the full grain ration the meat will be nearly as firm as those of the dry lot, where grain alone has been fed. I find no distinction on the market between lucerne-fed swine and those purely grain-fed, and they sell price and price alike. The general health of the lucerne-fed hogs is equal to that of those maintained on any other feed, and they are as prolific."

On April 1st, 1905, Mr. J. E. Woodford placed ten choice pure-bred Poland-China brood sows from twelve to eighteen months old that were due to farrow in the latter days of June, on a five-acre field of lucerne. They were given no other feed than the lucerne pasturage until they had farrowed and their pigs were a week old. After that the sows had in addition to the lucerne some bran slop until about August 20th, when new maize was fit for feeding. He says: "The sows from the time they were turned on the lucerne until the last week in June made a remarkable growth besides gaining somewhat in flesh. They did well with their pigs, reared an average of seven to each sow, and as sucklers they were a sight to see. The pigs were the most attractive bunch ever raised in the Coffey County, as admitted by our breeding competitors. We weighed a gilt from this lot when six months and five days old, and her weight of two hundred and twenty-five pounds was not above the average of the whole lot. In our lifelong experience in rearing swine we have found nothing of the grass kind for them that in value approaches lucerne."

Lucerne has been thus proved in the United States to be an excellent and profitable food for pigs, and there seems no reason why it should not also give good results in Natal. It is, at any rate, worthy of a trial. Should there be any readers who have given lucerne a trial in the matter of pig-feeding it would be of interest if they would communicate their experiences to the *Journal*.

The Manuring of Tea.*

By GEORGE A. COWIE, M.A., B.Sc.

WHEN the soil is no longer able to supply the requisite amounts of the proper food constituents which the plant requires, then the necessity for manuring arises. The length of time during which any particular soil will be able to nourish the plants, without the aid of manures, will, of course, depend on its original state of fertility and on the extent to which it is cultivated. But no matter how rich the land may have been in the plant food substances at the start, it must in course of time, through cultivation, become deficient in some of the essential ingredients. This period in the case of tea cultivation will be much shorter, for obvious reasons, than in the case of many other plants, for tea, as is well known, is a continuous growth crop and removes yearly from the soil *undue proportions* of certain constituents (mainly nitrogen and potash). Moreover, during the growth of tea very little cultivation is done, and consequently only small quantities of the inert plant food are liberated. In some places, also, the tea plantations are very much exposed, and there is much of the better portion of the soil lost by wind or rain. It is, therefore, evident that after an interval of greater or less duration, according to the quality and composition of the soil, suitable manures must be applied to enrich the soil with the proper food constituents and thus enable it to produce the best crops.

STABLE OR STALL MANURE.

Stable or stall manure, the oldest of all forms of manure, still holds its position as a most valuable kind of plant food. Stable manure con-

* This article and those which are to follow, in the April and May issues of the *Journal*, are taken from an essay on "The Fertilisation of Tea," published by the *Tropical Life* Publishing Department of Messrs. John Bale, Sons & Danielsson, Ltd., to which we refer in our "Notes and Comments" in the present issue.—ED.

tains all the ingredients necessary for plant growth, and it may thus be classified as a complete food. At the same time it is very bulky and contains a very large proportion of practically useless water—about 15 cwts. in each ton. In some cases this bulkiness is of great advantage to the soil, for it renders very light soils more retentive of moisture and heavy soils are ameliorated and made less tenacious owing to the penetration of air and water. On the low-lying flat lands, where exhaustion has generally taken place in organic matter and nitrogen, the application of this manure is followed by advantageous results.

It is now generally admitted that the most profitable way to use stable manure is in combination with artificials. An outstanding reason for this is that it is very rarely indeed that sufficient dung is made on the farm to suffice for all the manurial requirements of the crops grown. Besides, the young crop requires a large quantity of available food, and this cannot always be obtained in sufficient abundance from stall manure; for, as is well known, a relatively small amount of plant food is contained in even heavy dressings of dung, and a considerable proportion of the contained food is in a form not easily assimilable by the growing plant. However, if stable manure be properly collected and preserved it should provide a considerable part of the total manure required on the estate. It should be applied in the spring and immediately hoed in. For filling up vacancies or blanks in the tea plantations it is of the greatest value.

One of the principal uses of stable manure is that it supplies the soil with humus matter. Humus occurs in two forms, "humid" and "arid," but sometimes a transition may take place from one form to the other. This occurs principally when humus suddenly becomes exposed to climatic conditions that favour the formation of the arid form. The best growth-producing qualities are contained in the humid form, because it has greater power of absorbing moisture and mineral substances in a form fit for assimilation. The presence of arid humus is not nearly so important to plant life, for it is a well known fact that a soil rich in arid humus always repays fertilizing with organic matter which contains or gives rise to humid humus. It follows that the use of dung or other fertilizers that serve to amass the humid humus is decidedly to be recommended on the numerous plantations of the "arid region."

Although stall manure is of great value to some soils in the cultivation of tea, it is not always possible to obtain sufficient quantity for the manuring of this crop. It is estimated by Mr. Bamber that it takes 10 to 20 tons of cattle manure to an acre in order to produce real or lasting benefit. Dr. Mann puts the quantity at 10 tons. On most estates there is always a little manure available from cows, sheep, goats, pigs, etc., in the possession of the coolies and others. This should be properly preserved in pits with as much dry jungle as possible, and covered from the influence of sun and rain. Gypsum, kainit or sulphate of potash occasion-

ally sprinkled over the heaps would not only prevent the loss of nitrogen, but would also improve the quality of the dung to a great extent.

For plantations in good bearing condition stable and natural manures are specially recommended, as the effects are more permanent and the valuable plant foods are yielded up only by slow degrees. Easily soluble artificial manures, on the other hand, should be used chiefly on exhausted or weakly plantations, as it is desirable to improve them and bring them up to a high standard of productiveness as quickly as possible, or to supply the lack of any special food constituent in an otherwise fertile soil.

GREEN MANURING.

Nitrogen is known to be the most important constituent of the plant food, and an insufficiency of this substance is immediately made manifest by the poorness of the crop under cultivation.

It is quite essential that an ample supply of nitrogenous food be furnished to the plant, if successive good results are to be obtained. As nitrogen also is the most expensive ingredient in manures, it is highly desirable that planters should do all they can to keep down expenses by utilising as far as possible natural methods of replenishing the soil to make up for the annual loss of nitrogenous material caused by the growing plant.

It is only within recent years that public attention has been drawn to the fact that all fertile soils contain an enormous number of bacteria, which have the unique faculty of assimilating atmospheric nitrogen in association with plants belonging to the order of the *Leguminosae*. These organisms are of minute size, and live in colonies in wart-like tubercles on the roots of the leguminous plants. The arrangement seems to be a mutually advantageous one, for while the bacteria receive a measure of protection, the legumes in turn are paid by becoming enriched in nitrogen absorbed from the atmosphere.

If none of the bacteria are present in the soil leguminous plants are poorly developed, but with an increase in the number of bacteria a corresponding increase in the growth of the legumes takes place. Two celebrated German professors, Nobbe and Hiltner, realised that if they could add these bacteria to soils devoid of or poorly supplied with these organisms, they would thereby enable young legumes to develop tubercles and so grow into full, healthy plants. In the cultivation and propagation of these nitrogen-fixing bacteria great success has been achieved, and what promises to be an important method of obtaining this valuable plant food has been established. For if these leguminous plants can be easily and economically grown, it is surely better policy for the planter to encourage their cultivation in every way, and so obtain cheap nitrogenous manure from the air, than to pay large sums for nitrogen as contained in artificial manures. Fortunately for agriculture, it has been

found that the plants which live in this symbiotic state with the nitrogen-forming bacteria, can be both cheaply and easily grown. The class of plants which enter into this relationship with the bacteria is represented by such trees as dadaps and albizzia and such herds as crotalaria, ground-nuts, beans, etc. Generally it may be said that the roots of all legumes bear nodules or tubercles of varying size, which consist almost entirely of nitrogen-fixing bacteria.

Although the nodules are sometimes rich in nitrogen (7 to 8 per cent.), it is not so much the nitrogen contained in them as that contained in the leaves and stalks which has been passed on from the roots, that enriches the soil.

Messrs. Bamber & Bruce, the well-known agricultural experimenters, analyzed three samples of leguminous plants with the following results:—

NITROGEN IN FRESH MATERIAL—			Percentage.
Sample I.—(a)	Stems and Leaves	...	0.730
	(b) Roots	...	0.386
Sample II.—(a)	Stems and Leaves	...	0.120
	(b) Roots	...	0.560
Sample III.—(a)	Stems and Leaves	...	0.991
	(b) Roots	...	0.466
NITROGEN IN SUN-DRIED MATERIAL—			
Sample I.—(a)	Stems and Leaves	...	3.840
	(b) Roots	...	1.760

From these figures it is seen that the stems and leaves are more important than the roots with regard to the amount of nitrogen they can supply to the soil.

It is obvious, then, that the proper method to adopt if we wish to obtain the benefit of atmospheric nitrogen is to grow and then bury the green crop in the soil. Of course this presupposes the existence to start with of a certain amount of nitrogen-fixing bacteria in the soil. Comparatively few soils, however, do not contain these little workers in greater or less abundance. When the members are very small, or where the organisms are absent altogether, it has been found possible to inoculate the soil with a bacterial culture called nitrogen, or with another soil containing the proper bacteria.

To obtain satisfactory results with green manures the legumes should be planted in very wet weather, and neither allowed to seed nor to occupy the land for too long a period. Crotalaria, dadaps and albizzia have been found most suitable for growing along with the tea plant.

Crotalaria.—This plant possesses many disadvantages as a green manure, for not only do its roots bear an exceptionally large number of nodules, but the plant itself dies down every year and forms a mulch; it being very desirable that a green manure does not permanently occupy the ground.

Crotalaria is a very quick grower and soon gives a cover to the soil, which keeps the weeds in check, protects the soil from wash, re-

tains moisture and helps to prevent large variations in soil temperature, and thus aids the growth of bacteria.

Crotalaria yields a very large amount of organic matter, as is clearly shown by the results of an experiment carried out at the Experimental Station at Peradeniya, Ceylon.

Species Grown.	Sown.	Seed Used.	Pruned or Uprooted.	Per Acre lbs.
<i>Crotalaria striata</i>	July 9, 1904	20 lb.	Nov., 1904 ...	3,661
do	do	do	Dec., 1904 .	10,128½
do	do	do	April, 1905 ...	7,054½
Total ...	...	...	...	20,244

Experiments were also conducted on growing *crotalaria* on specially poor soil. Here 80 lbs. sulphate of potash and 200 lbs. basic slag were applied per acre. The result was a crop of 8,000 lbs. per acre, which provided as much organic matter as could be utilised on an acre of tea land. This proved that even on the poorest soil an excellent crop of *crotalaria* can be grown, provided it receives the assistance of a moderate quantity of suitable artificial manure.

It has been found desirable to use a large quantity of seed. From 20 to 30 lbs. seed per acre is recommended. It is advisable to sow in wet weather and lightly fork over a depth of 4 to 6 inches. With young tea it is best to broadcast the seed, but with mature plants one should sow the seed along alternate lines only. The time of sowing varies according to the district and the object in view. When the crop grown gives a dense cover, the success of *crotalaria* is sometimes uncertain, and it is better under these circumstances to sow the seed immediately after pruning and to apply a soluble potash and a phosphatic manure; 40 to 80 lbs. sulphate of potash with 200 lbs. basic slag will be found to yield good results.

Ground Nuts.—It is usual that the smallest croppers are the greatest leaf producers, *e.g.*, the Mauritius variety will, under favourable conditions, produce two crops a year, equal to 1½ tons an acre per annum, while the Pondicherry variety will yield only 300 to 500 lbs. yearly. The latter, however, gives a yield of leaf equal to about 9,000 lbs. of organic matter, while the former yields only about 2,000 lbs.

It is not advisable to use heavy croppers on account of the heavy hold they take of the soil. It is better to use leaf-producing varieties with the simple object of enriching the soil.

Prunings.—As to whether prunings should be buried or burned, great diversity of opinion exists. Mr. Edward Delvin, in his paper on "Tea Cultivation in Ceylon," opposes the practice of burying prunings on account of the dangers from fungoid disease and wash on land that is inclined to be steep.

On the other hand, many writers and planters hold that the value

of prunings as a manure is very great, and that much loss results from burning them. Mr. Bald, in his book "Indian Tea, its Culture and Manufacture," states that prunings as a manure are of great value, especially if buried deeply and in a green state. "Valuable manurial properties have been destroyed by burning the prunings, while, as compared with other gardens where the prunings have not been burnt, there has been no apparent result in the direction of subduing the pests. Theoretically the ashes are distributed to form manure for the whole ground; in most instances, however, this is mere theory, as the ashes of an acre of prunings are usually distributed over but a few square yards of land."

It is sometimes advised to burn the prunings in the case of land infested with white ants, or where the bushes show signs of fungoid disease, as thread fungus or red rust. According to Dr. Mann burning should in every case be resorted to to get rid of prunings, if blights are prevalent in the garden. "To leave prunings lying about in a garden with these blights on them is suicidal, and to bury them is dangerous. If the garden is, however, free from blight there does not seem any absolute reason against burying the light prunings—and these only—provided the following conditions are adhered to:—

"(1) They must be buried deep. At least 6 inches of soil should be left on top of them, so that they will not be turned up by the hoe.

"(2) They should be buried immediately on pruning, or as soon after as possible. In Ceylon, trenches are dug to receive the pruning before the bushes are touched at all, and the prunings are put into them practically at once. Once dried up, much of the manurial value has gone or is rendered less valuable.

"(3) They should be buried with something which will destroy any latent germs or spores of fungi which are upon them. The best materials for this are lime and basic slag, which not only cause the blight spores to be destroyed, but also the prunings to rot more quickly."

With regard to the burying of tea prunings around the bush, Mr. W. B. Jackson, the veteran manager of Mr. Strachan's well-known group of Agra Estates, says:—

"(1) We commenced burying prunings in 1894, and in 1895 we applied 5 cwts. of lime with the green prunings.

"(2) After one or two applications of lime we applied as an alternative 5 cwts. of basic slag and then went back again to lime.

"(3) This is also our present system, but as the trees are larger we do not bury the larger branches but only the strippings of these, the wood being burnt.

"(4) I know of no bad results from this practice.

"(5) But of many good results, and we are now as much in favour of this plan as ever we were."

(To be continued.)

Feeding Live Stock.

NOTES ON THE RESULTS OF SOME RECENT EXPERIMENTS.

To present the reader with an anything like exhaustive account of recent work performed in the way of live stock feeding experiments would be a practical impossibility. The field is far too large—even if we consider English-speaking countries only;—for not only are the British Isles and the Colonies included in it—quite a large enough field in itself—but we have also to include the United States of America, with its large number of agricultural experiment stations; and we must also take into consideration India, where experimental work is from time to time undertaken. Thus we can never hope to do more than note the results of a few of the experiments as they come to our notice; and it is in continuance of this plan that we note this month a few of the results which have been obtained recently in experimental work in Anacricia as set out in the publications noted at the head of each section of this article.

I.—MEALIES *vs.* OATS FOR HORSES.

FEEDING WORK HORSES: A COMPARISON OF CORN AND OATS. By B. E. Carmichael. (Bulletin No. 195 of the Ohio Agricultural Experiment Station.)

Problems connected with the feeding of work horses are doubtless of as wide interest as any problems in live stock management. Practically all farmers, whatever particular branch of farming they may be engaged in, have occasion to feed work horses. Besides farmers, commercial firms of various classes keep horses in large numbers for work purposes, and they, too, have a deep interest in methods of feeding that will lessen the cost of maintaining work horses, without decreasing their efficiency.

Many horsemen believe oats to be the best single grain feed for horses, whether kept for draught or for road purposes. It has been stated time and again by practical horsemen and others, that horses fed upon oats display more life, keep in better condition and endure work, especially during hot weather, better than do horses which receive a grain ration made up largely or exclusively of mealies. And this belief in the efficiency of oats as a grain feed for horses is so strong with some horsemen that they are willing to pay exorbitant prices for oats, rather than feed mealies.

A study of the chemical composition of maize and of oats fails to show any good reason for the exceedingly high favour in which oats are held, or for mealies being considered so totally unfit for the use of horses.

especially when at hard work. It has been claimed that oats contain a stimulating principle known as "avenine" which gives great spirit to horses. The existence of this stimulating principle has not been proved, and it is safe to say that its existence is very improbable. Even if it does exist, there is no evidence to indicate that it would have any special bearing upon the practical feeding of work horses.

On account of this wide-spread prejudice against mealies and in favour of oats, an experiment, from which it is hoped that definite data may be secured in regard to this important subject, has been undertaken at the Ohio Station. The plan of this work calls for a long time-experiment—not one of a few days' or weeks' duration, but one that will continue for a number of years.

The work was begun in the spring of 1907, and the results of the experiment up to the present time are so striking that it has been thought best to give them to the public at once, with the understanding that further work is being done along this line and that there is a possibility of different results being secured later.

The use of mealies for work horses did not induce laziness and lack of endurance. Neither did the use of oats induce increased spirit and endurance. When mixed (clover and timothy) hay was fed to mature geldings at general farm work, ear-maize was practically as efficient, pound for pound, as oats.

On the basis of the results of this experiment and statistical records of farm values of grains, in America maize has, since 1886, been cheaper than oats as a grain feed for work horses.

The drop in weight of the maize-fed horses, coincident with the beginning of the use of shelled mealies, indicates that ear-maize is to be preferred above shelled mealies for work horses.

Farm animals should be fed according to their needs. Their needs depend, of course, upon the product that they yield. Work horses are kept for supplying energy and should be supplied with feeds that will furnish the required energy at the least possible cost, all things considered.

There is a wide difference in the efficiency of horses in utilising feed. There is an "individuality" in work horses as well as in other farm animals. Horses that are notably hard to keep in good condition should be replaced by ones that may be maintained at less cost.

The data presented do not prove that, for use with pure timothy hay, ear-maize is as efficient, pound for pound, as oats. Neither is any evidence at hand to indicate that a grain ration made up exclusively of mealies is suitable for brood mares with foal or in milk, or for young, growing horses.

When the weights of the horses for the year previous to the experiment are compared with the weights secured during the experiment, it

is seen that the exclusive use of either maize or oats has not had any bad effect upon the horses. There is no positive proof, however, that a mixed ration would not be more efficient than one made up exclusively of maize or of oats. This experiment does show, nevertheless, that mealies are a valuable feed for work horses and should be given a large place in their rations, whenever market conditions warrant their use.

It is obvious that feed for work horses should be palatable, efficient and economical. As far as palatableness is concerned, maize seems, in the experience of the Ohio Station, to have a slight advantage over oats, although this will depend to a considerable extent upon the individual appetite.

The results obtained thus far in the experiment reported indicate that maize is an efficient feed for work horses. The bulk of an amount of ear-maize equal in feeding value to the usual amount of oats is small—so small that a casual observation might lead one to believe that too little maize was being used.

II.—CATTLE FEEDING EXPERIMENTS.

1. SILAGE FOR FATTENING CATTLE. By B. E. Carmichael. (Bulletin No. 193 of the Ohio Agricultural Experiment Station.)

2. STEER-FEEDING EXPERIMENTS, 1907-8. By T. L. Mairs and W. H. Tomhave. (Bulletin No. 88, Pennsylvania Agricultural Experiment Station.)

SILAGE FOR CATTLE.

An experiment was begun at the Ohio Agricultural Experiment Station in February, 1907, for the purpose of ascertaining the value of mealie silage for fattening cattle. While the results of the experiment indicate that silage may be used with profit, a single experiment, as Mr. Carmichael points out, will not justify very far-reaching conclusions. The results of the first test are, therefore, given to cattle-feeders with the express statement that further work along this line is needed before conclusive evidence can be obtained. Sufficient evidence, it is stated, is at hand, however, to justify the assertion that silage may, under some conditions, give very satisfactory results when used for fattening cattle.

The animals purchased for use in this experiment consisted of 42 head of steers, most of them good Shorthorns.

The steers were divided into six lots of seven steers each. The lots were numbered from 1 to 6 inclusive. Lots 1, 3 and 5 received a ration consisting in part of maize silage, while Lots 2, 4 and 6 received dry feeds exclusively. The lots which were fed silage received, after they had become accustomed to it, 25 pounds of silage per head daily, in two equal feeds. On account of the grain which was present in the silage, Lots 2, 4 and 6 (fed the dry ration) were fed more shelled maize than Lots 1, 3

and 5 received. Cottonseed meal was fed regularly to all lots in the same amounts, beginning with one-half pound daily per steer. When lucerne, clover and soy-bean hay were fed a smaller amount of cottonseed meal was given than when mixed (clover and timothy) hay was fed. The highest amount of cottonseed fed was 2.5 pounds daily per steer. All lots received stover and hay of various kinds, but the silage-fed lots consumed much less of these feeds than did the dry-fed lots. Shelled maize was fed.

Hogs were put with each lot of cattle. The plan was to have a sufficient number of hogs in each pen to consume all of the grain that appeared in the steers' droppings. However, throughout the experiment a small amount of maize was left by the hogs in all of the lots. At the beginning of the test two hogs were put with each of the steers, later on another hog was added to each lot. On May 22nd the first set of hogs was sold and four thin hogs were put with each lot of steers.

Each lot of cattle and the hogs which followed them occupied a small pen, having about 320 to 345 square feet of floor space, feed racks included. Although these quarters were very small, yet the cattle seemed to suffer no special inconvenience from the close confinement. For a part of the time the hogs were allowed access to small lots outside of the barn. It seems very probable that fattening cattle do not need so much room as is afforded by many maize belt feed lots.

Salt was constantly before the steers, common barrel salt being used. Care was taken to avoid allowing the steers access to a large amount of salt while they were very "salt hungry." Small amounts were given until the steers did not show a very great desire for it, after which a generous supply was placed where they could have free access to it.

Water was supplied to the steers in small galvanised iron tanks, one in each pen. These small tanks were filled from a larger storage tank in the barn.

Refuse hay and stover, consisting of the impurities and very coarse parts of these feeds, together with wheat and oat straw, were used for bedding. The pens were kept in good condition at all times, but no excessive amount of bedding was supplied.

The hay that was fed consisted of various kinds, grown on the Station farm. When any kind was used, it was used for all the lots, that is, when clover hay was being fed, all six lots of the steers received clover hay. The mealie stover was grown on the farm and was cut to short lengths before being fed. When cut it was much more convenient to handle and the refuse was more useful for bedding than it would have been if the stover had been fed whole. The mealie silage had been in the silo for more than a year, having been put in during the autumn of 1905. It was made from a large variety of silage maize, rather than from the local smaller-growing, heavy-eared varieties. The cottonseed meal was

purchased from a Memphis (Tennessee) firm. It was the so-called "extra prime" meal.

The use of a ration containing 25 pounds of silage daily, per steer, was attended in this experiment with almost exactly the same rate of grain as was the use of a dry ration.

The results of this experiment indicate that silage may be used to good advantage in the fattening of cattle, when stover and hay are high in price. The relative value would, of course, depend upon the prevailing prices for other feeds.

No difference in the finish of the two sets of cattle was apparent. This was shown by the fact that although, when the cattle were at market, one pen contained only silage-fed cattle, and another only dry-fed cattle, a buyer of wide experience, without knowing how the cattle had been fed, purchased both lots at the same price. Other expert cattlemen failed to note any difference between the two lots of cattle.

It is not to be expected that silage alone or silage and other rough feed will produce a high finish in a short feeding period, since not enough grain is present in the silage for this purpose. Less shelled maize was required, however, by the steers that received silage than by the ones that received only dry feed.

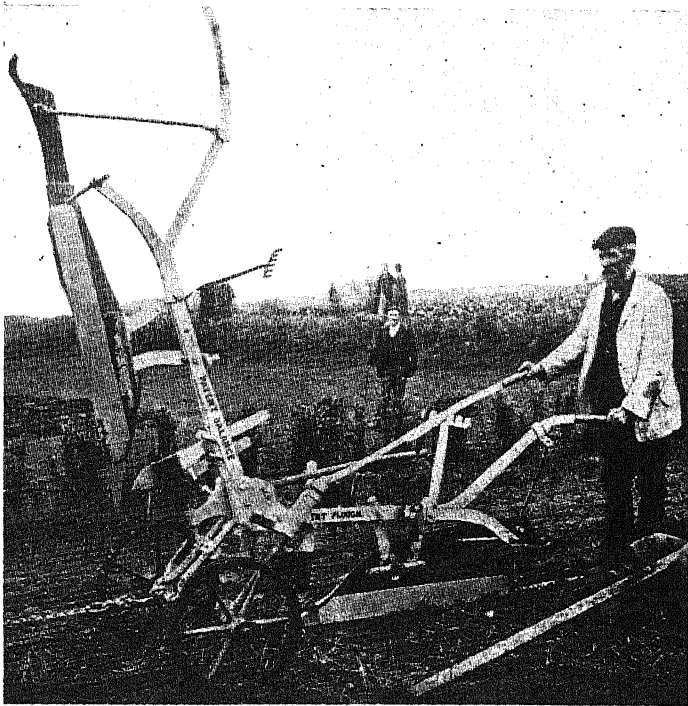
Hogs that followed silage-fed cattle, when less shelled maize was fed to the cattle on account of the mealies in the silage, made fewer pounds gain per steer than did hogs that followed cattle receiving all of their mealies in the form of shelled maize.

The feeding of tankage to the hogs that followed these cattle was attended with greatly increased gains. It is believed that other feeds, such as skim milk, linseed, oatmeal, middlings, soy-beans or lucerne hay could be used to good advantage for this purpose.

EXPERIMENTS IN STEER-FEEDING.

In order to secure some evidence as to what the ratio of total dry matter should be to digestible matter, and to determine to what extent maize silage may be profitably fed to fattening steers, an experiment was planned by the Pennsylvania Agricultural Experiment Station. The test was designed to compare a limited grain ration with a full grain ration for fattening steers when fed in connection with maize silage and mixed hay and maize stover for roughage, the amount of digestible matter to be the same.

Two lots of twelve steers each were selected for this experiment. These two lots were made as nearly equal as was thought possible as regards size, breeding and general adaptability for fattening. Both lots were placed in pens in the basement of the College barn and were fed from October 30th to February 6th on the experiment. Previous to this time they had all been fed together. A supply of drinking water was con-



A TYPICAL BALANCE PLOUGH.

Responsible for the best piece of work in a recent ploughing match, reported in the *Implement and Machinery Review* (to which journal we are indebted for our illustration).

stantly before them. They were weighed on three consecutive days at the beginning and at the close of the experiment and on two consecutive days at two weeks' intervals throughout the test. The water was shut off at 5 o'clock on the day preceding the weighing in each case. The weighing began at 9 a.m. and proceeded as rapidly as possible, Lot I. being weighed first in each instance.

Both lots received the same kind of feed, consisting of broken-ear maize and cottonseed meal as concentrates, corn silage in the morning, and in the evening mixed hay, to December 12th, and maize stover from that time to the close of the experiment. Lot I. received all the ear maize they would eat, while Lot II. received about two-thirds as much as Lot I. Lot I. received two pounds of cottonseed meal per steer per day, and Lot II. two and one-quarter pounds. It was the intention to feed Lot II. twice as much maize silage as was fed to Lot I. when on full feed. Lot II. was given all the maize silage they would eat with a limited grain ration. Lot I. was given all the maize they would eat with a limited silage ration. The intention was so to apportion the feed that the two lots would get the same amount of digestible matter, but Lot I. should receive the more concentrated ration, that is Lot II. should receive the greater amount of dry matter. The maize fed was of a very poor quality, as was practically all the maize in Pennsylvania in 1907, but the other feeds were probably up to the average. The feed was weighed and determined for each two weeks coinciding with the weighing periods of the steers.

When maize silage forms a considerable portion of the ration of fattening steers more care is required in getting them on full feed than when a dry ration is fed exclusively, or silage is fed in small quantities.

Omitting the first two weeks, steers fed maize silage *ad libitum* once a day and a limited grain ration made better gains during the first half of a fourteen weeks' fattening period than did steers on a full ration with about half a silage ration, while during the last half of the fattening period the results were reversed.

During the early part of a fourteen weeks' fattening period the steers getting the larger quantity of dry matter in their feed made slightly better gains than those getting the smaller quantity of dry matter in connection with an equivalent amount of nutrients, and during the latter part of the period the steers getting these nutrients in connection with the smaller amount of dry matter made the better gains.

Slaughter tests failed to show any difference in the carcasses of the two lots that might be attributed to the difference in the feed.

At the prices for feed named in this article the steers receiving the smaller amount of dry matter made the more economical gains.

Steers in an open shed ate slightly more roughage than those in a well-ventilated barn when getting an equal amount of grain.

Steers in an open shed made practically the same gains as those in a well-ventilated barn on the same grain ration.

III.—EXPERIMENTS IN LAMB-FEEDING.

RATION EXPERIMENT WITH LAMBS, 1906-7. By G. E. Morton. (Bulletin No. 79, Wyoming Experiment Station.)

The Wyoming Agricultural Experiment Station has since 1904 been carrying out a series of experiments in lamb-feeding, and the results of these have now been published. The questions which the experiments were intended to answer were:—

1. What gains will lambs make upon peas in the field?
2. How many lambs will an acre of peas "finish"?
3. Will it not pay to feed pea hay rather than turn the lambs upon peas in the field?
4. How does pea-feeding compare with the lucerne and maize ration?
5. What gain gives the best results with native hay for fattening lambs?
6. Is sweet clover hay of any value for feeding lambs?

The results show that Scotch barley equals maize when fed with lucerne hay; and that lucerne and ground flax seed makes a very satisfactory ration.

Native (wild) hay is not nearly as valuable as lucerne hay for fattening lambs. It gives much better results when fed with oil meal and Scotch barley, bald barley, or oats, than when fed with maize or maize meal, and such a ration will give about two-thirds the gain that lucerne and maize will give.

Peas in the field produce about 5 or 6 pounds of gain per head each month. They are more nearly allied to native hay and grain in the results they produce than they are to lucerne and maize. The carcass is not "finished" and the flesh is less firm.

Pea hay is much less satisfactory than peas "hogged off" in the field.

Sweet clover is of somewhat less value than lucerne when fed with maize, but makes a very satisfactory feed. Range lambs like it from the start.

(To be continued.)

It has been found that the only practical means of reducing the losses of nitrogen in a manure heap is to place a layer of old, well-rotted farmyard manure as a basis for the new manure heap. This has a distinctly beneficial effect, and always results in smaller losses of nitrogen, possibly because of the constant evolution of carbonic acid from the layer of old manure.

Agriculture in the Orange River Colony.

PROGRESS DURING 1907-8.

THE recently-issued Annual Report of the Director of Agriculture for the Orange River Colony (Mr. W. J. Palmer) is an excellent statement of the conditions which have prevailed and of the progress in farming which has been made during the year ended 30th June, 1908. The full report of the Department consists in all of 231 pages, comprising the separate reports of the Director, the Sheep and Wool Division, the Experimental Farms Division, the Forestry Division, Agronomy Division, Horticultural and Biological Division, the Chief Stock Inspector's Division and Meteorological Division.

Mr. Palmer in his report states that agricultural conditions during the past season were not as favourable as anticipated, for the lack of late summer rains so seriously affected the mealie, Kafir corn and other summer crops that the harvest proved, in many instances, a complete and, in most cases, a partial failure. Taking into consideration the acreage planted, it is probable that only a quarter of the yield expected was actually fit to harvest. On the other hand, oats, wheat and rye gave abundant returns, so much so that there was a considerable surplus of the former grain which was purchased by exporters for shipment to Australia. The comparative freedom from locusts, combined with early spring rains, were the direct causes of this prolific harvest.

It is pleasing to note, Mr. Palmer continues, the increased attention which is being given to the growth of lucerne, plots of which are now to be found on many farms. The acreage at present planted with this valuable forage crop, while of considerable extent, may be greatly extended, with profit to the growers.

The horse-breeding industry is receiving encouraging support, and the demand for sound thoroughbred and other well-bred stallions is worthy of note. In order to prevent the use of undesirable sires, Mr. Palmer considers that legislation should be enacted making it obligatory for owners to obtain a certificate of soundness and of suitability before a stallion is offered for public service and a system of subsidy for high-class sires might be introduced similar to that existing in England.

"Taking the Colony as a whole," Mr. Palmer continues, "agriculture has, notwithstanding the great financial and industrial depression, made steady and satisfactory progress. Much fencing has been completed, small irrigation schemes carried into effect, new buildings erected, and fruit and shelter trees planted, while the results of the first season's export trade in mealies and oats have so extended the farmers' horizon that, as a class, they are much more optimistic than formerly."

We may now deal in more detail with the progress of farming in the Orange River Colony as discussed by the Director of Agriculture.

ANIMAL DISEASES.

The Colony had no very heavy loss during the year under review from contagious and local animal diseases. The usual trouble was experienced with the wire worm, geel ziekte and other diseases amongst sheep. The Colony managed to keep free from infection by East Coast Fever; the brown tick, which is the chief carrier, has not yet appeared on the high veld, and it is hoped that by keeping cattle from Natal and Transvaal out of the Colony the red tick which is found in most districts will not become inoculated.

The work of scab eradication has been carried on satisfactorily. At the time of writing the report, scab was well in hand on the east of the railway, but it still existed on many farms, and in some districts of the west it was almost beyond control for the time being. Ports of entry with dipping tanks had been established at important points along the Basutoland and Cape Borders; whilst careful inspection was being exercised with regard to sheep entering the Colony from Natal.

PURCHASE OF AUSTRALIAN SHEEP.

During the past year several additional shipments of Australian sheep were imported at the same price as formerly—namely, £6 for rams and £3 for ewes. Fifteen hundred of these animals were delivered to 237 farmers, most of whom were quite pleased with their purchases. In addition to this general scheme, a considerable number of special orders for stud rams and ewes were passed to the buyers, Messrs. Hogan, McCarthy & Co., of Australia, all of which animals have now been satisfactorily delivered.

THE WOOL INDUSTRY.

The wool industry made gratifying progress during the year, the demand for experts being so keen that, in addition to Mr. McNab, the Department of Agriculture employed three other men with like qualifications, who gave a considerable amount of assistance to farmers all over the Colony in shearing, classing and packing their wool, the result being enhanced prices for the clips. The success of this work has been so encouraging that Mr. Palmer anticipates that within the next two or three years O.R.C. wool will bring a price in the English markets equal to the average sent from Australia.

EXPERIMENTAL FARMS.

The two experimental and stock farms at Tweespruit and Grootvlei are now well established, and if sufficient funds are forthcoming to conduct operations and carry on experiments these places will prove of immense value in the development of the Colony.

There are three main objects for which these farms were originally founded, viz.:—

- (1) As stud farms for the direct benefit of stock breeders.
- (2) As experimental farms where useful experiments could be carried on in stock-breeding and in agricultural and horticultural operations.
- (3) As educational centres for young men and as bureaux of information for the older inhabitants.

FORESTRY AND HORTICULTURE.

Forestry operations were continued at the Bloemfontein King's Park and Arboretum, at Grootvlei and Tweespruit farms, at the Imperani sleeper plantation and on the four forest nurseries proper, Wilgeboom Nek, Ladybrand, Harrismith and Holfontein. Gratifying progress has been made at all of these places which now begin to show some results for the money expended and the energy displayed during the past four years. Large numbers of trees have been disposed of to Corporations and private persons, while Government institutions have been supplied free of charge.

The Horticultural Division gave considerable assistance and advice during the year to fruit growers in their pruning and marketing operations. It was intended to send trial shipments of plums, apples and pears to the London markets, but hailstorms and drought so affected the quantity and quality of the crops that this idea had to be abandoned; it will, however, be taken up again.

The tobacco industry received some attention under the supervision of Mr. Schoeman, who conducted operations on a ten-acre experimental plot of dry land situated at Schoeman's Drift, Vredefort District. New varieties are being tried and experiments conducted with different fertilisers with a view to the improvement of the quality and increase in quantity of the green leaf. The drying, sweating and curing of the leaf is under careful supervision.

AGRICULTURAL EDUCATION.

With regard to agricultural education, the Director of Agriculture says:—

"I regret to say that little advance has been made in that extremely important matter of agricultural education. I would urge the serious consideration of Government to a start being made at Tweespruit at the earliest possible date. We have suitable residential buildings there to accommodate twelve to fifteen students, but without funds we cannot provide class-rooms or engage a resident teacher. While the members of our staff might arrange a series of lectures on different agricultural subjects, we cannot spare an official to take charge of the boys. An initial outlay of, say, £2,000, together with an annual expenditure in

salaries of £500 and upwards, would enable us to impart a practical agricultural education each season to at least a few young men, who, as a result, would be better farmers and citizens.

"Such instruction might be given in conjunction with the Grey College regular courses, thus preventing that undesirable tendency which is, unfortunately, only too marked in a general education of 'educating the boys away from the farm.'

"It is gratifying to know that Mr. M. Joubert, who has now spent two years at the Guelph (Canada) Agricultural College and who will remain there until May, 1909, in order to qualify for the degree of Bachelor Scientific Agriculture, is spoken of very highly by the College President and staff. As in the case of all the young men who were sent by this Department to other Colonies and countries to study agriculture in its different branches, Mr. Joubert is a credit to his country, and bids fair to make his mark among the few hundred Canadians with whom he studies."

AGRICULTURAL INDUSTRIES.

Dairy Industries.

A notable advance was made in the organisation of industries of an agricultural nature by the formation of a co-operative body of farmers, who, in September, 1907, took over the Government Tweespruit Creamery as a successful going concern. During the period of three years when this factory was started and operated by the Department the following results were obtained:—

QUANTITY OF BUTTER SOLD.

			lbs.
From start, December, 1904, to June, 1905	...	...	16,804
From June, 1905, to June, 1906	...	...	72,248
From June, 1906, to September 30th, 1907	...	...	210,825
			<hr/> 303,880

AMOUNT DISTRIBUTED AMONG PATRONS.

			£	s.	d.
From start, December, 1904, to June, 1905	...	...	1,399	13	0
From June, 1905, to June, 1906	...	...	4,745	8	0
From June, 1906, to September, 1907	...	...	8,712	1	0
			<hr/> £14,857	2	0

AMOUNT PAID FOR CARTING CREAM.

			£	s.	d.
From start, Dec. 1904, to June, 1905	...	...	118	3	0
From June, 1905, to June, 1906	...	...	325	18	0
From June, 1906, to September, 1907	...	...	182	2	0
			<hr/> 626	3	0

and since the formation of the new Company the business has increased at a very rapid rate, the total output since September being approximately 120 tons and the amount paid to farmers for cream (exclusive of any bonus which may be voted) over £9,000.

The Orangia Creamery Company of Bethlehem began operations in October last with a model building and plant, the plans of which were supplied by this Department, and since that date have paid for cream over £3,600, out of which was produced approximately forty tons of butter, all of which has been sold at a profit. The first annual meeting of the shareholders of this Company was held recently, when a satisfactory financial statement was submitted.

The Heilbron Dairy Co., Ltd., is now in process of formation and promises to prove a success as soon as sufficient capital is forthcoming to begin operations. Movements are also on foot among local residents to organise similar Companies at Harrismith, Senekal and Boshof, and this Department is now in communication with leading business men and farmers at these three centres with a view to ascertaining whether or not the local conditions warrant the establishment of such industries.

Pork Factories.

The Ladybrand Pork Factory was started by a syndicate of farmers and business men a few months ago, and has since paid out a considerable sum for pigs at a price of 4d. per lb. live weight, which means a good profit for the producer. The output of this factory includes hams, bacon, rolled bacon, sausages, lard and brawn, for which a ready market is found in the larger consuming centres.

"There is great room," the Director remarks, "for improvement in the general quality of pigs obtainable, but it is pleasing to note that an active demand is springing up for pure bred animals, notably Yorkshires and Berkshires. While this, therefore, is still an infant industry, I look for considerable development as soon as it is firmly established, and we may hope for such an increased output of pork products within the near future that importation will finally stop."

Cheese-Making.

This is receiving increased attention and is capable of great extension in the future. The largest private manufacturers at present in the Colony are Messrs. J. A. Malcolm, of Petrusburg; Hugh Davids, Bultfontein; and E. W. Galpin, Reitz. These farmers now supply the local markets with an excellent quality of sweet milk, Cheddar and Stilton cheese which is quite equal to the imported article. While under existing conditions it is doubtful if a large co-operative cheese factory could be made profitable, there is still room for many farmers to follow in the footsteps of the above three producers, thereby obtaining adequate returns for their surplus milk and for the labour involved in manufacturing cheese.

Fruit-Canning Factories.

The two fruit-canning and jam factories—namely, that of Anderson & Co., at Bloemfontein, and the O.R.C. Canning Co., at Parijs—established within the last four years have now developed into industries which employ a fair amount of white labour and convert the surplus fruit crops of the farmer into a marketable commodity which finds a ready sale all over South Africa. In order that our farmers may be posted on the requirements of these industries, I give below the opinions of the managers of both factories as expressed in letters addressed to me under date 5th and 7th August last. The communication from the O.R.C. Canning Co. reads as follows:—

“We may state that we put up a fairly large quantity of jams and canned fruits last season. The quality of the fruit was not such as we would have desired. The trees require a great deal more attention and cultivation than they receive at present, and farmers must get rid of the idea that anything is good enough for a jam factory. We consider that there are great possibilities in this district for the cultivation of strawberries, tomatoes, Cape gooseberries and English gooseberries, and for the planting out of the best qualities of apricots, plums, pears and apples for canning purposes. We believe that business can be done in beans, peas, asparagus, etc. Mealies require a special plant, and we do not see the advisability of canning them at present. We have not come as far as canning vegetables, but we hope to do so this coming season.”

Anderson & Co. state that “the chief difficulty which has confronted us here is in the lack of variety of fruits grown in the O.R.C. suitable for preserving. The supply of quinces, peaches and apples is greatly in excess of the demand, and such fruits as apricots, plums, damsons, Cape gooseberries, figs, blackberries and strawberries are obtainable. The chief demand is for apricot jam and the apricot is the fruit most used in the manufacture of preserves. The quality of the fruit we can obtain has been on the whole quite satisfactory.

“Quinces and apples should be packed in grain bags; other fruits in cases about the size of milk cases without any leaves or straw, which only cause the fruit to become heated.

“We do not put up canned fruits or vegetables, this being a business which can only be undertaken with a factory situated where the fruit is grown.

“We enclose our printed circular *re* chicory-growing, for which we think there is a great future in this Colony. We have appointed agents in various parts of the Colony to whom we have supplied seed at cost price with a view of inducing farmers to go in for growing the root. The price we are offering for sun-dried chicory root is £15 per ton delivered at our works. There is a large demand for this article, and at present we are quite unable to get sufficient raw material to enable us

to execute orders. So far we have not been able to get any considerable quantity of root in this Colony, but what we have got has been of excellent quality."

EXPORT OF MAIZE AND OATS.

The export of maize from the O.R.C. has now been firmly established; whilst oats exported in large quantities, but chiefly to Australia, where, owing to season's drought, there was a strong demand.

EXPORT OF MEAT.

Comparing agricultural statistics as gathered in April, 1904, with those obtained in December, 1907, the enormous increase in stock will be noticed.

				April, 1904.	Dec., 1907.
Cattle	...	...	...	363,204	585,977
Horses	...	...	...	75,251	127,579
Sheep	...	...	...	2,999,547	8,020,308
Goats	...	...	...	734,169	1,251,606
Pigs	...	...	...	61,409	62,439

With the exception of pigs, which show only a slight gain, due largely to the lack of demand, the increase of all other stock shows not only how rapidly the agricultural wealth of the Colony is accumulating, but points very clearly, Mr. Palmer remarks, "to the fact that we shall very shortly be forced to export our surplus mutton and thus come in direct competition in the world's markets with frozen meat from Australasia, and, while we may hope to compete favourably with Australian wool in the London and Continental markets, we can expect to obtain equal prices for our mutton, for the reason that a considerable proportion of the Australasian mutton is produced from cross-bred sheep, having a much heavier and more profitable meat carcase than our Merinos. From the limited information which I have before me at present I do not think, therefore, it would be safe to estimate a higher price to the farmer than 8s. for a 40 to 50 lbs. hamel in good condition when sold for export or, say, 2d. to 2½d. per lb. live weight. This estimate will, I know, come as a shock to sheep owners who have been accustomed to sell hamels of this weight at from 15s. to 21s. It must be remembered, however, that such animals have always been consumed in South Africa, and when we begin to look to outside markets the position will be entirely different."

IRRIGATION.

Mr. Palmer concludes his interesting report with a reminder to farmers as to the value of irrigation, and draws attention to an interesting and valuable article prepared by Mr. A. Stead, of the Public Health Department, on "The Soils and Water of Arid Countries," which forms

an annexure to the Departmental report. Every farmer who practices irrigation on a large or small scale should endeavour to apply as far as possible the principles laid down in that article, *viz.*—

1. By adopting such a system that the amount of available water will be sufficient to thoroughly irrigate the land and drain out the noxious salts.

2. To keep a sufficient soil mulch by constant stirring of the surface soil.

3. In the case of water containing sodium carbonate apply gypsum from time to time both to loosen the particles of the soil and transform the injurious salts to those less harmful to plant growth.

If such important matters are entirely neglected the soil will, through the accumulation of harmful salts, sooner or later become unfitted for the production of any crop.

There is nothing better for a filly than plenty of good bran and a liberal allowance of crushed oats, with an occasional mash of boiled linseed in which an ounce or two of salt is mixed. A pound or so of boiled beans and some bran mixed with them is also beneficial when given occasionally. A large lump of rock salt within easy reach of the filly will be greatly appreciated and have a good effect.

CLOSE SEASON FOR OYSTERS.—The issue of the following Order has been approved by His Excellency the Governor in Council:—"Whereas by an Order of the Governor in Council bearing date the fourth day of January, 1907, the period beginning the 1st day of November, and ending the last day of February, from year to year, both inclusive, was declared to be a close season for Oysters: And whereas it is deemed necessary to extend the said period in respect of the Oyster-bearing areas between the south shore of the Entrance to Port Natal and the Umtamvuna River: Now, therefore, it is hereby further ordered that the close season defined by the aforesaid Order of 4th January, 1907, shall, as regards the coastline between the points aforesaid, be extended from the 1st March to the 31st October, 1909, during which period it shall be unlawful to take, capture, disturb, or destroy in any manner any Oyster whatsoever."

Afforestation in England.

PROPOSALS OF THE ROYAL COMMISSION.

AN important report has lately been issued in England by the Royal Commission appointed to enquire into the question of afforestation in the United Kingdom, with particular reference to the subject of unemployment and the possibility of making use of out-of-work labour in this connection.

The following are the conclusions—unanimous with the exception of Mr. A. Stanley Wilson, M.P.—at which the Commission has arrived:—

“That afforestation in the United Kingdom is both practicable and desirable.

“Approximate available area in the United Kingdom without material encroachment upon agricultural land is 9,000,000 acres.

“Best rotation to secure sustained timber yield requires 150,000 acres to be afforested annually. EMPLOYMENT—

“TEMPORARY.—Temporary employment is afforded annually to 18,000 men during the winter months. Further, an almost equal number would indirectly derive employment in the incidental and subsidiary occupations connected with forestry. This figure might be increased in any year to meet exceptional pressure of unemployment.

“PERMANENT.—Permanent employment is afforded to one man per 100 acres afforested, rising to 90,000 men when the whole area has been dealt with.

“ULTIMATE.—The employment connected with subsidiary industries, *i.e.*, conversion and manipulation, etc., of the timber crop, would afford occupation for a still larger population.

“Any scheme of national afforestation should be on an economic basis.

“LABOUR.—There are sufficient unemployed persons willing to submit to, and able to satisfy, ordinary labour tests, who could advantageously be employed without a period of special training.

“FINANCE.—Afforestation represents a productive investment, and should be financed by a loan. The annual sum required for the full scheme is £2,000,000. The interest on the loan should be defrayed out of taxation. The net deficit will be £90,000 in the first year, and will rise progressively to £3,131,250 in the fortieth year, after which period the forest becomes more than self-supporting.

“PROFITS.—After eighty years the net revenue from the forest, at present prices—which promise to be materially enhanced—should be £17,500,000. This represents $3\frac{3}{4}$ per cent. on the net cost calculated at accumulated compound interest of 3 per cent. Looked at from another

point of view, the State will then be in possession of property worth £562,000,000, or about £107,000,000 in excess of the total cost involved in its creation, calculated at 3 per cent. compound interest.

“ADMINISTRATION AND CONTROL.—The afforestation scheme to be entrusted to a special Board of Commissioners. In default of purchase by agreement, land to be acquired if necessary under compulsory powers.

“DISTURBANCE.—The acquisition of grazing areas for silviculture might necessitate a modification of the existing agricultural system on certain farms. There is no reason to suppose that the remaining lowland areas on such farms could not either be adapted to other forms of agriculture or could not, in many cases, be profitably utilised for small holdings. The acquisition of grazing areas, private or common, should present no difficulty which cannot be satisfied by arbitration and reasonable compensation.

“INCIDENTAL.—Afforestation creates a new industry; it does not compete with private enterprise. The conversion of comparatively unprofitable lands into forests enhances the productiveness of the adjacent areas, and should promote the development of the small holdings movement. More than any other apparent remedy, afforestation will stem the tide of rural depopulation.”

EMPLOYMENT AND FINANCE.

The questions of employment and finance are, in the opinion of the Commissioners, of paramount importance. As regards the former, not only about 18,000 men find work during the winter months, but large numbers of others would benefit, since each of these men would, on an average, have a family of four persons, thus raising the total number assisted to about 72,000 annually. Beyond these, of course, an equal number would incidentally and indirectly derive employment in the various subsidiary occupations. For instance, roads would have to be made, houses built, and all the needs of a great community would have to be supplied. Therefore the *prima facie* figure of 18,000 would by no means represent the total number of people who would ultimately benefit by this great scheme.

The financial aspect is of vital interest, and the Commissioners recognise that the State should not be asked to support an undertaking which is financially unsound, or could not be conducted at a profit. After considerable inquiry, they find that there is a sufficient number of persons out of employment who are able and willing to submit to the ordinary labour tests, and who could be put to work connected with afforestation without any period of special training. By this is meant that there are undoubtedly great masses of employable labourers out of work through circumstances beyond their control who are quite competent to deal with the various tasks which would spring up with a scheme of afforestation.

It is calculated that the work of planting, with its concomitant

operations, will furnish employment for six months at the rate of twelve men to 100 acres, but when everything is considered the cost of afforesting 100 acres will represent the equivalent of the wages of sixteen men for a similar period, or of eight men for a year. The Commissioners have worked out the cost of an acre of ground spread over a period of 80 years as follows:—

Initial expenditure at £6 10s. per acre at 3 per cent. for eighty years	£	s.	d.
Capital value of land, say £5 at 3 per cent. compound interest for eighty years	69	3	2
	53	4	0
	£122	7	2

“This,” it is added, “is a figure which may reasonably be anticipated from the sale of the standing crop of timber at the age of eighty years, and would mean a crop of less than 3,700 cubic feet at 8d. per foot. Every £1 spent at the beginning amounts roughly, at 3 per cent. compound interest, to £10 12s. in eighty years. Therefore the expenditure of £5 per acre on ploughing and similar agricultural operations would increase the final charge against the forest by a further sum of £53 4s., making £175 11s. 2d. in all. A crop of 5,267 cubic feet at 8d. per foot would be required to cover this initial outlay, and although such a result may not infrequently be obtained, it is evident that we are now approaching the probable limit of profit.”

OUT-OF-WORK PROBLEM.

The problem of the unemployed is closely identified with this proposed national undertaking, and the Commissioners state:

“We are of opinion that a scheme of afforestation would contribute to the solution of the unemployed problem, and that the extent of this contribution would depend upon the scale of the undertaking. It should be remembered, in this connection, that the permanent staff employed in maintaining a forest area would be ten times more numerous than that for which the land in question at present provides an occupation. This increase in population alone would go far to stem the tide of rural depopulation, and the encouragement of small holdings in connection with silviculture would have a similar effect.

“But it is in the creation more than in the maintenance of a forest that the largest demand for a supply of labour is made. On the average, every 100 acres afforested provide employment for twelve men for six months. The planting season, which extends from October to March, is the period of the greatest activity in silviculture, and it coincides with the season of acutest annual unemployment. Moreover, the elasticity to which silviculture is susceptible renders it capable of considerable adjustment to meet recurrent or abnormal times of depression. Further, the employment afforded by harvesting and converting the timber crop, though remote, is too important to be ignored.

"With careful selection, proper supervision, and due regard to previous occupation, afforestation, mainly through the agency of the unemployed, should not prove unsatisfactory either as regards the work performed or its financial results, while the advantageous effect on the men themselves cannot easily be over-estimated. From the large and varied body which comprises the unemployed as many suitable men can be obtained as a scheme, even of considerable dimensions, could normally be able to absorb.

"In times of special distress the elasticity to which reference has been made would admit of an extension of operations so as to include a less efficient and more numerous class. Here some preliminary training by the Forest Commissioners, Distress Committees, or other agencies, would be indispensable. No doubt the expense incurred in this direction would involve some diminution of profit, but it is impossible to ignore the moral and material loss to the community which unemployment occasions, and your Commissioners are disposed to recommend that if recourse be had to this expedient, the objections may properly be surmounted by debiting the additional charge to a separate account, or by meeting it by means of an Exchequer grant.

BUSINESS PROPOSITION.

The Commissioners lay stress upon the fact that this is purely a business proposition. It is proposed to recruit out-of-works through distress committees or labour bureaux, and in the event of any persons so recruited not being suitable to be put on manual labour, and requiring a period of training, the cost of preparing such men must be charged to a separate account. In short, the Commissioners have no wish to mix up the question of afforestation with any sort of scheme of Poor Law relief, and any additional expenditure for training unemployables should therefore be provided in some other way.

ACQUISITION OF LAND.

As regards the acquisition of the necessary land for the planting of trees, the Commissioners urge that every effort should be made to obtain it by private treaty, but in the event of that failing they recommend that compulsory powers should be acquired, and made use of to obtain suitable properties. Such compulsory powers, they state, should not be used harshly, and owners of land should receive compensation to the full value of any tracts acquired. No violent measures are intended to be taken, but, on the other hand, individuals will not have it in their power to place any obstacles in the way of the carrying out of this gigantic scheme by stipulating for impossible prices for land. It is proposed that in making purchases the Commissioners shall take as a precedent the Small Holdings Act of 1907, so far as it is applicable to forestry.

Assuming that the State were to embark on a large scheme of national afforestation, the Commissioners think that a certain amount of disturb-

ance of the existing population would be inevitable. In some cases whole farms would be embraced in the operations, and the tenants would probably find holdings elsewhere. At any rate, it would serve in many cases the excellent purpose of creating a number of smaller holdings. The report states that afforestation creates an absolutely new industry in this country, which cannot compete with any private enterprise. It is obvious, the Commissioners think, that few private owners can undertake the raising of a great wealth of trees which require eighty years to mature, since in that time many unforeseen changes will have taken place. Again, the question of capital, in the case of an individual, is the greatest drawback, as its investment in tree-planting must mean the disappearance of any immediate return, and probably of any return whatever during the owner's lifetime.

CHECKING MIGRATION TO TOWNS.

It would seem, therefore, in the view of the Commissioners, that, apart from any other advantages, a large comprehensive work of afforestation carried out with care from decade to decade would have the effect of checking the flow of population from the country to the towns. Incidentally, one of the industries to gain by the creation of forests would be paper-making, in view of the fact that the supply of pulp would in the course of time be forthcoming locally. At present there are but two wood pulp mills in this country, and they are supplied entirely with foreign wood. There is every reason to suppose that within a few years the price of such pulp will rise considerably, inasmuch as an extra tax has been put upon timber in certain parts of Scandinavia. In addition, large tracts of forests are annually destroyed by accidental fires, so that year by year the world grows poorer as regards its own resources, whilst on the other hand but little new tree-planting on a large scale is taking place.

The following table illustrates the percentage of land occupied by forests in European countries:—

England	...	...	...	...	5.3
Scotland	...	...	...	...	4.6
Wales	...	...	...	...	3.9
Ireland	...	...	...	...	1.5
Denmark	...	...	...	...	7.2
Holland	...	...	...	...	7.9
France	...	...	...	...	17.0
Belgium	...	...	...	...	17.3
Germany	...	...	...	...	25.9
Hungary	...	...	...	...	27.5
Austria	...	...	...	...	32.6

Expert witnesses, examined by the Commissioners with reference to the future scarcity of timber, stated, in effect:

"In less than thirty years there will be no timber available, unless the different countries of the world set about replanting immediately, and that, although every country takes it up now, the regeneration will not be anything like half enough to keep pace with the consumption."

The Frozen Lamb Trade.

VIEWES OF AN ENGLISH EXPERT.

A SPECIAL commissioner of the Western Australia Government, Mr. Charles Harper, was busy in London last year acquiring all information possible concerning Western Australia's opportunities of developing trade and commerce with England. Among other matters he gave particular attention to the frozen meat trade, and one of his interviews—with Mr. Henry S. Fitter, the head of the firm of Henry Fitter & Sons, meat salesmen, of the Central Meat Markets, Smithfield—was specially reported by the London correspondent of the *Western Mail*, of Perth.

Mr. Harper opened the interview with the request that Mr. Fitter would say something about his firm's methods of distribution in London and the provinces.

Mr. Fitter replied:—"We have three stands in the market here (Smithfield). We have another stand in the abattoir at Liverpool. Sometimes consignments go direct to Liverpool, and sometimes through the London stores to Liverpool. We have offices at Liverpool as well as the stand at the abattoir. From Liverpool the supplies go into the provincial districts of the Midlands and the North of England, but not very much goes beyond the manufacturing centres in those districts. A little frozen mutton and lamb goes to Glasgow and Edinburgh, but not very much goes further north in Scotland."

"Why is that?"

"They get their lambs very often much cheaper on the spot than if they were imported from the South. Lamb in the North of Scotland is often worth much less than it is in London, added to which there is the cost of carriage from London or Liverpool."

EFFECTS OF FREEZING.

"Do you find that the taste for lamb and mutton is growing on the part of the consumer?"

"Lamb pleases the consumer best. It is not only tender, but its flavour is attractive. Then again, chilling does not effect that deterioration in quality in lamb to the extent to which it does in mutton. This distinction is even more marked in the case of beef. The juices in beef are so much heavier than in either mutton or lamb, and they run away so much more when the meat is thawed. You will understand that all the corpuscles and tissues of the meat are exploded by freezing. In other words, the cells burst. Afterwards, in the process of thawing, the juices are loosened and run away. If you had a shop for the sale of frozen beef,

you would have to mop up the place to keep it in good order from the escape of these fluids."

"That does not apply to lamb?"

"No, for the reason that it does not carry the same amount of juice that beef does."

"And the same with pork?"

"And the same with pork. It does not carry very much juice. In beef this juice will run into the fat, which is first reddened, and afterwards will turn brown, or even black."

TEG MUTTON.

"Does the 'teg' mutton suffer very much in this way?"

"The 'teg' mutton does not suffer as much as the full-grown sheep. For this reason, among others, the trade in 'teg' mutton is bound to grow more than the sheep trade. As a matter of fact, the really prime mutton trade is not making any headway. New Zealand had a splendid trade at one time in mutton, and the growers in that country had an opportunity of developing something choice in the way of mutton, but they appear to have weakened the stock either by leaving the weaker lambs to mature, or by growing for wool rather than for mutton. The butcher here wants a really high grade of mutton. If he does not get it he cannot depend upon pleasing his customers."

"What is the character of the best mutton?"

"Well, they used to go in for breeding from pure-bred South Downs, and the mutton they grew for market was the first cross. The first cross makes a very good sheep. After a time in New Zealand they did not trouble to confine themselves to the first cross. They were content with a three-quarter cross, until at last you could not see any strain of the 'Downs' in the animal. This class of sheep is not as good as the first cross, either in quality or appearance. It does not eat so well; it is longer in the leg and coarse in the flesh."

"I take it that you cannot have perfection in sheep without a plump leg?"

"Yes, you want a long, low sheep—one that stands low on the ground."

"Is the Southdown better than the Shropshire?"

"I am not an expert in live sheep, but graziers and cattle-breeders tell me that the best sheep they can send us is the first cross with the 'Downs.'"

"Do you think we would be safe in fattening our carry-over lambs to send later in the year? Do you think that the 'teg' trade would justify this?"

"Well, that is a matter upon which I could not express any opinion without first seeing how they would turn out."

THE BEST LAMB.

"I think you told me in a previous conversation I had with you on this subject that the best lamb we could send you would be the most rapidly grown, as long as its condition was good?"

"That is so. The best lamb is that which matures well at a small weight."

"What weight?"

"Anything under 36 lbs. Of course we can do with lambs up to 40 lbs. I am supposing, of course, that the smaller lambs are of good breeding and in good condition, if you are going to get the best results. If the smaller weights are weedy the bigger weights may give better results in the market. A peculiarity about the lamb trade this year is that the bigger lambs have been making more money per lb. than the smaller."

"You don't know that that will last?"

"No.: it is due to what may be temporary conditions. It is in consequence of the large proportion of small and weedy lambs coming from Australia that the bigger lambs are doing relatively better. The same thing applies to New Zealand. There they have had a drought such as they have never had before. The result is that 75 per cent. of the lambs were small lambs, and consequently the 'tegs' were making more than the small lambs?"

"Nevertheless, as a rule, you prefer the small lambs?"

"Yes, we can usually do more with small lambs than with big ones. The biggest demand is always for lambs about 36 lbs."

"How about fat?"

"The consumer does not want too much fat. In the manufacturing districts in the North they won't have fat. It does not matter how small the lamb is—30 lbs. or 32 lbs. will do them, but they will not have either fat lambs or big lambs. This trade in the manufacturing and mining districts in the North is a pretty large proportion of the whole trade, and we have to cater for it with this knowledge that the consumers don't like the meat heavy or fat. If we were to send to Liverpool 10,000 Australian lambs averaging from 40 to 42 lbs., we should have to sell them as mutton."

"Do you get Australian lambs sent direct to Liverpool?"

"We get both Australian and New Zealand lambs direct to Liverpool."

DIRECT AND INDIRECT SHIPMENTS.

A long conversation here followed between Mr. Harper and Mr. Fitter relative to the conditions of direct shipment from Australia to London and Liverpool respectively and also to Liverpool *via* London. Mr. Fitter's manager was called into consultation with reference to freight charges, dock dues, and similar details, full particulars of which were promised as soon as procured.

The general conclusion to be drawn from Mr. Fitter's facts in this connection was that it would be cheaper on the whole to ship from Fremantle direct to Liverpool than from Fremantle to Liverpool *via* London. In both cases dock dues would have to be paid, but it was explained that in the case of transshipment from London there would be no dock dues in London to be paid. On the score of dock dues there was, therefore, no material difference between the direct shipment and the *via* London shipment, but there were other considerations that would affect the question. Taking the White Star Line, for instance, it was pointed out that these boats come to London to discharge the London portion of their cargoes and then go on to Liverpool. If one of these boats had a shipment of lamb for Liverpool it would be cheaper to take that shipment on to that port than to land it in London and train it to Liverpool. The train charge was 25s. per ton in lots of over three tons, but if time was a matter of the first consideration in getting to the Liverpool market, it might be more profitable, as it would be more expeditious to unload the Liverpool consignment at London and train it to Liverpool instead of waiting some days for it to go on by steamer.

KIDNEYS AND FAT.

Returning to the other question concerning the conditions affecting the Anglo-Australian meat trade, Mr. Harper desired to know whether the Western Australian shippers of lambs should leave the kidneys and fat in the carcasses, or have them removed before shipment.

Mr. Fitter: "Well, in small lambs it does not matter very much. The buyer ordinarily does not care very much either way, provided the amount of kidney fat is not large; but, generally speaking, I should say that, as regards most lambs, the buyers would prefer to have had the fat previously removed."

"Could you give us any idea of what is too much fat in a lamb?"

"It just depends upon the size of the lamb. A small lamb, say 32 lbs., would not really carry too much fat. I might, indeed, go so far as to say that if you wanted to do so you might leave the kidneys in anything up to 33 lbs. or 34 lbs. But when you come to the heavier lambs, say up to 40 lbs., they are apt to be fat inside, and carry a lot of kidney fat. It would be quite easy for a 40 lbs. lamb to carry 4 lbs. of fat, with the kidney itself weighed in. To leave this out, the lamb would be reduced by 4 lbs., but any loss in this direction would be counterbalanced by a better price per pound."

"Then I take it that, provided the kidney and fat did not weigh more than 1 lb. or 2 lbs., it would be an advantage to the grower to leave it in, because he would get the benefit of the extra weight without any loss in price per pound?"

"Yes, I should think so."

"It would mean that if the rate per pound was 5d. the grower would get anything from 5d. to 10d. more for the whole carcase than if the kidney fat has been taken out?"

"Yes, provided that only small or medium-sized meaty lambs are thus dealt with; large lambs are often too fat for this."

EARLIEST DATE OF SHIPMENTS.

"That leads me to another important question. What is the earliest date of shipment you would advise? We are a little ahead of the Eastern States in nearness to the English market, because of the fact that Fremantle is the last port of call in Australia, and also because sometimes our lambs are a little ahead in maturing. Is there any advantage in shipping early?"

"As a rule, yes."

"We could if necessary begin shipments by the end of September or the beginning of October. They would be here five weeks later—say the beginning of November. Would that be a good time to come on the market?"

"Yes, a very good time. The earlier you are in the season the better. It is always an advantage to us as sellers to be able to announce the arrival of the first shipment of lambs, whether it be from Australia or New Zealand. There is always keen competition for the first shipment, and, of course, all other things being equal, there should be better prices."

"Would it be useful to you if information of the departure and quantity of frozen meat cargoes was cabled regularly from Western Australia?"

"It would certainly be a very great advantage to us and to the market generally."

MERINO CARCASE MUTTON.

"Do you think there would be any market for merino carcase mutton?"

"Of course, there is always a market here, but prices would depend entirely upon what River Plate mutton is making. The Plate mutton rules this market."

"Our merino mutton from the North, where they are talking of establishing freezing stations, is considered of high quality, and is in good demand in the State itself, but we shall probably be soon producing more than we can consume, and if we could see our way to opening up a market by direct shipments to England, we should be able to get rid of a lot of sheep which otherwise would hang on our hands. Is it possible to open up such an outlet for our surplus?"

"There is always a good trade in mutton, and always a market looking for supplies, but whether your growers would avail themselves of that market depends entirely upon whether the prices they would get would be

profitable to them. Your mutton would always have to compete with the River Plate mutton."

"Then the River Plate sets the standard?"

"Yes."

"Could you give me any idea of what is the standard rate?"

"There is not really any standard rate. The prevailing prices lately have been 3d. to 3½d., but generally I may say that prices have a tendency to improve, because the Plate growers are improving the quality of their stock by crossing."

"Would these carcasses find a good market at 50 lbs. to 55 lbs. weight?"

"That is a very useful weight."

"Would that apply to both London and the country?"

"The country, as a rule, is a better market for this class of mutton than London, provided the mutton is not too fat. As I have previously explained, the consumers in the midland and northern districts have a dread of fat. This applies particularly to the mining districts. I don't know whether it is the nature of the miner's occupation that affects them in such a way as to make them constitutionally averse to fat, but the fact remains that they are. You cannot have anything too lean for them. Their aversion to fat is so marked that they take very little butter."

BACON.

"Do you do anything with bacon?"

"We don't touch it except in the carcass. If you wanted to do anything in the way of supplying the London market, you should send small carcasses of from 60 lbs. to 64 lbs."

"The 'porker'?"

"Yes; the porker. Of course, we get some much heavier than this, but they never make the same price. I don't know what facilities you have in Western Australia for growing pork, but if you can produce it in large quantities you will be interested to know that the prospects are in favour of a better market than now exists. The demand for pork in England is a growing demand, but the local production is not keeping pace with it."

"All the milk, I suppose, is wanted for human consumption?"

"Not only that, but the laws press hardly on the industry. Whole carcasses are condemned because of a little swelling in the throat or a little redness in the flesh, in addition to which the purveyors are liable to fine or imprisonment. If you can send pork free of the suspicion of disease you will find a good and growing market."

"Anything of that kind is hardly likely to occur, because the trade would be to some extent under the control of the Government, and nothing would be permitted that would be likely to injure the trade or the

interests of the producer. Indeed, it may be taken for granted that the Government's sole desire is to see them develop the trade on lines that would give the best return to the producer."

"What is the best time for the pork to arrive here?"

"The winter months are the best—that is, the English winter months—generally from September to April. If we have anything like a warm May the trade drops at once."

"What would be a fair price for a 60 lb. to 70 lb. porker?"

"It is just now about 5d. to 5½d."

"Do you get much pork from New Zealand?"

"Not much. At one time we thought we were going to do a good trade with New Zealand, but they now say that all the milk is wanted over there as it is here."

"We, too, have learned the advantage of the small pig, and I understand that is what you would want principally if we are to open up a trade with you in pork?"

"That is so. The market does not want big joints of anything now to the same extent that it did years ago. At one time the working man had one huge joint a week. It provided not only his Sunday dinner, but it was made to last in various ways up to about Thursday. Now the working classes want their hot joint every day. Consequently, they prefer to have three or four small joints rather than one big one. I think that is one of the reasons why they want small lambs in the Midlands."

DRESSING AND BRANDING.

"How about the dressing of the lamb carcasses?"

"You cannot be too careful in the dressing. It is well worth the shipper's or grower's while to have each carcass dressed to the best possible advantage. Any little effort in that direction will be compensated in the long run, and get the brand a good reputation."

"Would you recommend each grower having a registered brand?"

"Only if he is big enough to make it worth his while for his brand to be known on the market. Not every man who sends 100 lambs or so. The trade want to buy in thousands, and they only attach importance to the brands of large shipments."

"Do you think the Commonwealth principle of not allowing lambs to be shipped except under a Government brand a good one?"

"Yes; perhaps so. As a matter of fact, the buyers here do not care much whether a carcass is labelled with a Government or municipal or any other brand. They go by what they see of the carcass themselves. They imagine that they are quite as good judges as the inspectors over in Australia. Still, a Government brand would do no harm."

CLAIMS FOR INSURANCE.

A long discussion ensued as to the circumstances attending the claims for insurance in connection with some shipments by the Grange

Line last season. Mr. Fitter, of course, was not able to say anything more than that in one case in which he was concerned the lambs were delivered in an unsatisfactory condition. Some of the carcasses were misshapen, indented, and the breasts pressed flat. His own inference from their condition was that the carcasses were originally frozen hard, then allowed to become soft, and afterwards re-frozen, but whether this took place on board ship, or on the other side, before the carcasses were shipped, he could not say.

Mr. Harper explained that it was practically impossible for the carcasses to become soft and then be re-frozen at Fremantle, because only a few minutes were necessary to convey the carcass from the freezing chambers to the ship's side.

Mr. Fitter's comment on this was that even in a hot sun the carcasses would not suffer from such a brief exposure, if carried in insulated cars. The carcasses he spoke of were squeezed out of shape, and that could not happen in the condition stated by Mr. Harper.

F.O.B. AND C.I.F.

Some further discussion also took place on the question of the growers in Western Australia selling their shipments of lambs f.o.b. at Fremantle, or whether the trade in London would prefer c.i.f.

Mr. Harper indicated that there was a feeling in Western Australia that it would be to the advantage of the farmer in Western Australia to get payment for the shipment of his lambs at Fremantle, instead of having to wait for the London returns, and Mr. Fitter admitted that that might be an advantage from the farmers' point of view, but he was very emphatically opposed to both f.o.b. and c.i.f. from the importer's point of view. He explained that they had had some experience of those systems, and they had not worked out very satisfactorily. The farmer, sure of his money whatever happened, cared very little for the extra finish which is necessary to ensure good quality and flavour. As they were only getting one price per lb., they argued, "We may just as well send our worst big lambs as our best small ones." The breeding also deteriorated. They argued, "What is the good of breeding for high quality if we do not get more money per lb.?" Under the existing system, however, it was to the farmer's interest to breed and ship lambs that would best suit the consumer's taste and command the best price. That system also suited the buyer.

GRADING LAMBS.

Before the interview closed, Mr. Fitter gave some interesting information as to the desirability of grading the lambs in accordance with the recognised custom in the trade. Last year some of the Western Australian shipments were graded by letters, others by numbers. It would be an advantage to have a uniform system, say, numbers only. It was

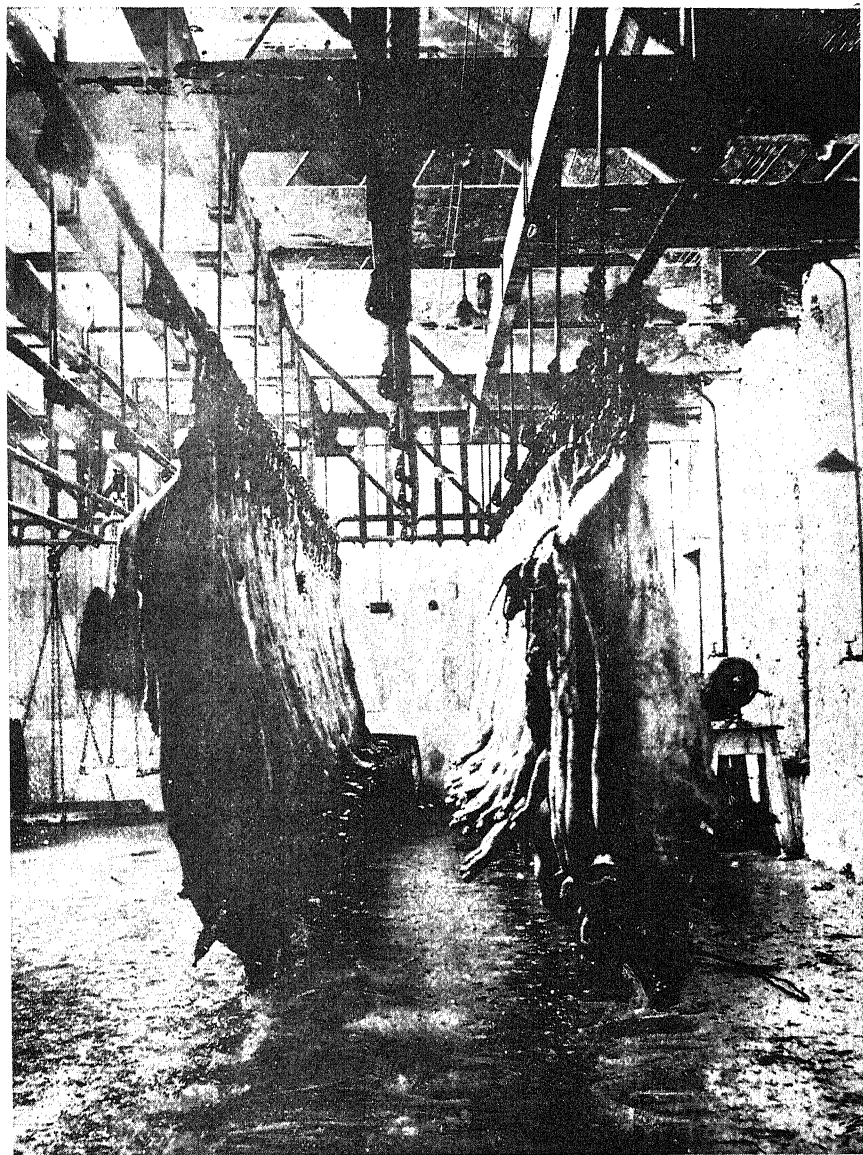
true that in New Zealand they had the two systems—Wellington lettering and Canterbury numbering—but the latter was the more important source of supply, and probably would be the better example for Western Australia to follow. Mr. Fitter explained the numbering system as follows: “Noughts” (the cipher “0”) meant carcasses under 28 lbs.; “twos” meant carcasses averaging 32 lbs., but ranging from 28 lbs. to 36 lbs.; “fours” meant “tegs,” or carcasses averaging 44 lbs., but ranging from 42 lbs. to 48 lbs.; “eights” meant 36 lbs. to 42 lbs., but there was a bigger “teg” marked as “T’s,” and ranging from 46 lbs. to 54 lbs. This “teg” really sold as very prime mutton, but care should be taken that it did not carry too much fat.

India-Rubber and its Production.

SOME NOTES ON RUBBER-YIELDING PLANTS.

RUBBER is not produced upon anything like a large scale in this Colony. In Northern Zululand the wild vines growing there are being exploited by syndicates, but there is little or nothing being done—so far as we are aware—in the way of fresh planting. According to the enquiries which are reaching our office, however, there is evidence of increasing interest in the possibilities of rubber production; and we accordingly publish, in the following article, a popular summary of the best information on the subject which we have in our possession. Which particular kinds of rubber are likely to prove suitable for Natal conditions we are not prepared at the present juncture to suggest, but readers will doubtless be able to form their own conclusions, so far as their particular districts are concerned, from the information which we publish herewith. That Ceara (*Manihot Glaziovii*) rubber trees, at least, will grow in Natal is proved by the following report by Mr. J. Medley Wood, the Director of the Botanic Gardens, Durban, which appeared in the *Kew Bulletin* in the early eighties:—

“The plant which yields ‘Ceara scrap’ is considered to be one of the most valuable of the rubber-yielding plants, and was introduced into these gardens in 1878, but all attempts to propagate it were unsuccessful. In consequence, however, of further information received by me from abroad, another trial was made, and about twenty-five plants were reared and planted out in the garden, and thus a small beginning was made, to test whether or not the cultivation of this plant may be suc-



CAPPOQUIN BACON FACTORY.—I.

In the Hanging Loft. —After the carcasses are disembowelled and cleansed they are hoisted to the hanging loft where with head, feet, and flake lard with kidney, they are allowed to cool, and the excess of animal heat is allowed to dissipate.

cessfully carried out in the Colony. The present appearance and condition of our plants shows unmistakeably that the climate and soil of our garden are well suited to its growth. More plants will be ready for next spring, as we shall go on propagating them as quickly as possible for distribution."

We shall therefore give more attention to Ceara rubber than to the other kinds; but before proceeding to discuss separately the various kinds of rubber-producing plants we may first devote a little space to a discussion of rubber in general.

India rubber is the dry, coagulated milky substance known as "latex" obtained from a certain plants belonging chiefly to the natural orders *Euphorbiaceae*, *Moraceae*, *Artocarpaceae*, and *Apocynaceae*. This latex is not the sap, and must not be confused with it. Whilst it is not known definitely yet what the particular function played by this latex may be, it has nevertheless been proved that, although necessary to the life of the plant up to a certain age, after that time it is no longer so. After the tree has attained to a certain age tapping can be carried on without injury. Premature tapping, however, injures the trees, and gives an inferior product to that extracted from old trees.

There are two ways in which the latex is obtained from the tree: one of these is that of making incisions in the bark and collecting the fluid in tins or other receptacles as it issues forth; the other is by cutting down a whole tree—a barbarous method which is still practised in native forests in America and elsewhere.

The chief rubbers of commerce, to which we shall confine our attention in this article, are:—Ceara (*Manihot Glaziovii*), Para (*Hevea Brasiliensis*), Castilloa, *Ficus elastica*, and *Kickxia Africana*. We will consider each of these in turn:

I.—CEARA RUBBER.

(*Manihot Glaziovii*.)

The source of Ceara rubber, *Manihot Glaziovii*, is a moderately-sized tree, 30 to 50 feet high, with an erect stem, 8 to 20 inches in diameter, with ascending branches forming a dense rounded crown; the bark is purple grey, the thin silvery outer layers readily peeling off transversely in narrow strips. In the young state the plant somewhat resembles the well-known Cassava plant, and has similar swollen roots.

PROPAGATION AND PLANTING.

Mr. R. Cross, an Indian authority on the subject, gives the following directions for propagating and planting:—"Seeds are early produced, if the tree is not shaded. They should be buried in brown soil, kept pretty moist until there are indications of growth, when they may

be planted out permanently. In some situations where the ground is rough and strong they might be sown broadcast. Meantime I would suggest the formation of plantations by cuttings, which will take root as easily as a willow. These should be taken from the points of strong shoots and may be one foot in length. In planting, each cutting may be put down in the soil to a depth of six inches. If scarce, the entire shoot may be cut into pieces, each possessing a bud, all of which will grow if covered with half an inch or so of soil. On loose sandy soil or exhausted coffee land, plantations may be formed at little expense. Hard, dry, gravelly wastes, if found to support any kind of bush, are also suitable sites. Holes might be made in strong land with an iron jumper and a stout cutting put into each and filled with pebbles. On bare or thinly-covered portions of rocks the cuttings might be laid down flat, and a little heap of stones or any kind of *debris*, about the size of a mole-hill, piled over each, care being taken that the extreme point of each cutting with a bud is left uncovered. I do not advocate planting in an entirely barren desert, but wherever there is any sort of stunted tree or scrub vegetation, with an occasional sprinkling from a monsoon shower, the tree is likely to prosper."

The seed coat is of remarkable thickness and very hard, and the natural process of germination occupies a long period—it is said more than a year. To hasten germination Dr. Trimen suggests assisting the seed coat in splitting. This is best effected by holding the seed firmly, and rasping off with a file both edges at the radicular end. It is best not to file off the actual end, as it may thus easily happen that the radicle of the embryo may be injured. After this treatment, properly performed, the young plant appears above ground in two or three weeks. The seedlings require no particular attention. They grow rapidly, and may be planted out finally at distances of 20 feet.

COLLECTING THE RUBBER.

The operation of collecting the latex or India rubber milk is of a very simple description. On commencing to work, in Mr. Cross' words, the collector takes with him a stout knife and a handful of twigs to serve as a broom. Arriving at a tree, any loose stones or dust are swept from the ground around the base, and some large leaves are laid down to receive the droppings of milk which trickle down. Some do not go to the trouble of sweeping the ground or laying down leaves, as a result of which the milk adheres to sand, dust, decayed leaves and other impurities. The outer surface of the bark of the trunk is pared or sliced off to a height of four or five feet. The milk then exudes and runs down in many tortuous courses, some of it ultimately falling on the ground. After several days the juice becomes dry and solid, and is then pulled off in strings and rolled up in balls or put into bags in loose masses.

Only a thin paring should be taken off: just deep enough to reach

the milk vessels; but this is not always attended to. Collecting is carried on during the dry season only, when rain seldom falls.

Mr. Cross says nothing as to the age of the trees so operated upon. In the sequel of his report, however, he incidentally remarks that Ceara rubber may be tapped on attaining "a diameter of 4 to 5 inches."

SUMMARY OF EXPERIENCE.

The result of experience so far gained in the experimental cultivation of the Ceara rubber plant are thus summarised by the *Kew Bulletin*:—

1. The plant is readily propagated both from seeds and cuttings. Seeds are abundantly produced in almost every part of the world where the plant has been introduced. They may be gathered from plants when only three to five years old. There is therefore the great advantage that a large area could be planted within a comparatively short period. Sowing the seeds in the position where they are to grow permanently is universally adopted in Brazil. It is possible, if adopted elsewhere, this plan would greatly reduce the cost of establishing plantations.

2. The Ceara rubber plant is very hardy, a fast grower, free from insect and fungoid attacks, requires little or no attention when once established and thrives in poor, dry and rocky soils unsuited to almost any other crop. It is evident, however, that the yield of a few trees cannot be remunerative, and only large areas can hope to make the industry a paying one.

3. It produces a good class of rubber, second only when well prepared to the best Para rubber. For this there is a steady and continuous demand. The yield per acre is apparently small, but a return is obtained earlier than from any other rubber plant. With thick planting and judicious thinning as the trees grow up it may be possible to increase the yield hitherto recorded; while with skilful treatment the trees may be tapped twice yearly and last in a productive state for 15 to 20 years.

4. In spite therefore of the apparent want of success which so far has attended experiments with Ceara rubber plants in Ceylon and other countries, the increasing importance of rubber as an article in large demand in all civilised countries at good prices suggests a reconsideration of the merits of this interesting plant. In many of our Colonies possessing a dry climate and a poor stony soil it is possible that large areas could be profitably occupied with Ceara rubber trees so grown as to provide annual crops for tapping.

II.—PARA RUBBER.

(*Hevea Brasiliensis*.)

Para rubber, which is the most important kind, is obtained from several species of *Hevea*, the chief of which is *H. Brasiliensis*. The trees

inhabit the dense steaming forests on the Amazon and its tributaries. In the Para district of the lower Amazon the temperature, according to *Spon's Encyclopoedia*, varies between 74 deg. and 95 deg. F., the mean of the year being 81 deg. The supply of moisture is also very regular. On the upper Amazon the atmosphere is densely vapour-laden. The soil is extremely rich mould. The trees will grow on the *terra firma* when planted, but their seeds naturally lodge in lowland swamps. All the species flourish best on rich alluvial clay slopes by the side of running water, where there is a certain amount of drainage; those growing on land which is periodically inundated (even to a depth of 5 feet) are more prolific than those on very low or on elevated ground.

Mr. H. N. Ridley states that in suitable soils it grows very fast and attains the height of about sixty feet, with a diameter of about two feet through the stem. The leaves, he continues, are dull green above and whitish underneath. The flowers are produced in panicles on the end of the branches. They are small and green, very sweetly scented, so that when a tree is in flower it can be protected by the scent of the blossoms. The flowers seem only to be produced when the tree has attained a considerable size. The fruit is produced some months after flowering; and it consists of a large three-lobed capsule about an inch and a half long, containing a single large seed in each lobe. When ripe the capsule splits explosively, throwing the seeds thirty or forty yards from the tree. This usually takes place in the hotter part of the day. The seed is about an inch long, rounded on the back and flattened in front, silvery marbled with brown colour, much resembling a castor oil bean on a large scale. They germinate usually very soon after planting, and do not require to be filled or otherwise specially treated as Ceara rubber seed usually does, but do not retain their germinating powers very long, and should be planted soon after they are ripe.

CULTIVATION.

Mr. Ridley gives the following directions for cultivation:—

Para rubber can be raised from seed or cuttings. The former is the most to be preferred. The seed is planted in nurseries and lightly covered with soil, and when about six inches high can be planted out.

Cuttings are recommended for use in inundated spots where the seed might float away. They are taken from lateral twigs and planted in the mud so that their tops are above the water, but they can also be grown in dryer spots shaded at first from the sun.

They should be made from well-grown wood, and not from the softer tops of the branches. It is sometimes stated that trees from cuttings do not last, and perish in a few years. Fallen trees, however, throw up strong stems, which eventually develop into healthy large trees, and, as it is stated that in South America trees are habitually grown from cuttings, there seems no reason why they should not be successful here.

The soils most suited for the plant is rich and very wet; such land as is commonly used for sago is very suitable, and wet rice fields or any damp low-lying ground will do. The tree will grow on dryer soil, but more slowly and in a less satisfactory manner. Where the ground is liable to shift from underground currents or streams cutting the soil away the trees, owing to their having no tap root, are rather liable to fall, and though they continue to grow even when prostrate they are much more difficult to tap. However, they are very easy to raise again with the aid of ropes, and can even when pretty large be propped up again, when they will continue to grow as before.

The trees can be planted about twelve feet apart or even closer. They grow very straight and do not spread very much unless planted far apart, and the closer they are planted the straighter and taller they grow. When planted they require no further care than to keep down the brushwood and grass the first year or two, after which they will draw up above the weeds, and if planted close together will soon so shade the ground that but few weeds will appear beneath them.

COLLECTING THE RUBBER.

Trees can be tapped at the age of three years if they are well grown, but it is perhaps better to wait until they are five years old, when they are stronger and the wounds would heal more readily. It appears from the account of Mr. Cross, who went to Para to investigate the methods of collecting the rubber and the habit of the tree, that it was the custom of the collectors there to tap the tree in the early morning, but in other countries such as the Malay Peninsula it appears to be best to tap in the evening after four o'clock, as the milk is thicker and more free from water then.

According to Mr. Ridley, the tapping is best done in the following way:—A number of oblique cuts are made in the bark converging to a central vertical cut, at the bottom of which a cup is placed. The rubber runs down the cuts into the central one, which conducts it to the cup.

The cuts should be made through the bark, which is about a quarter of an inch thick, but so as not to injure the wood, and should not be made more than half an inch wide. Their length, six or more inches, will depend on the thickness of the tree. These cuts may be re-opened a day or so later and more rubber will come out. It is best to make a small groove at first, cutting a thin slice off the edge of the wound each day till the groove is about half an inch wide. The wounds heal up in a few weeks if not too wide. Any sharp knife can be used to cut the bark.

The rubber usually sets in the cups, but in Para it appears that the milk has to be smoked in the smoke of burnt nuts.

Two pounds is said to be a fairly good estimate for a year's tapping of a five or six years old tree if well grown. Much depends, of course, on soil, climate, etc.

III.—CASTILLOA.

(*Castilloa elastica*.)

The plant from which the Castilloa rubber of commerce is obtained is the most important species—*C. Elastica*—of the genus *Castilloa* of the family *Moraceae*. It is found wild in Mexico from latitude 21 deg. southwards in Guatemala, Honduras, San Salvido, Costa Rica, and Nicaragua; it also appears to occur in north-western South America. It grows to a large tree, often 180 feet in height and 15 feet in girth. The growth is rapid. The bark is soft and thick; the leaves are large and oblong; and the fruit is somewhat fleshy, containing numerous small seeds about $\frac{1}{4}$ inch in diameter, with white papery seed coats. The tree requires a warm, steamy climate. The most common situations are in alluvial soil at the sides of valleys or on low ridges. It needs deep soil, with plenty of water, but does not thrive where the soil is swampy, nor in places where there is not good drainage at the roots. As we have said, the tree prefers a steamy climate, but it will do where this is interrupted by a dry season of two or three months. It grows best where the temperature never falls below 60 deg. at any time.

These facts we have culled from a circular issued in 1899 by the Director of the Royal Botanic Gardens, Peradeniya, Ceylon. We are indebted to the same circular for the information that follows regarding cultivation, tapping, etc.

CULTIVATION.

The seed should be sown as soon as obtained in a well-prepared nursery. They should be sown an inch deep, and about 8 inches apart, and lightly covered with a little vegetable mould. They must be kept lightly shaded, and watered when the surface of the ground is dry. In ten or twelve months the plants will be two feet high and ready for planting out.

Cuttings may also be taken; those from lateral branches do not grow well, and have a tendency to grow more or less horizontally, so that main sheets must be used. When cut back the main stem produces buds from the axils of the leaves, and these may in turn be used as cuttings, and so on. Cuttings should be at least 3 inches long, with a basal portion of old wood, and perhaps 12 inches is better, as described for the case of Para rubber.

The young plants should be planted out during rainy weather in prepared places. Holes should be dug and filled with well-prepared sandy, loamy soil. If the plantation is to consist of trees of *Castilloa* only they may be put at about 12 feet apart, or perhaps better a little

closer. If other products are to be cultivated between the rubber trees, the distance must be much greater. The young trees must be shaded for a time, and probably it would be best if they were shaded for two or three years till they reach a height of 20 feet or so. This might be effected by planting them, for instance on land already bearing such shade trees as are used for cocoa. On parts of estates where the canker has rendered it needful to cut out the cocoa it might be well worth while to try *Castilloa*. The ground should be kept clean of weeds and the trees watered in dry weather of long duration, until they reach sufficient size to take care of themselves.

TAPPING.

The tree should not be tapped until it reaches a girth of at least 2 feet. This should be attained in a period of perhaps nine years on the average, and it would be better to wait for two years more if possible till a girth of 2ft. 6in. is reached. After the eighth year there would probably be a fair number of trees in the plantation ready for tapping, and, of course, the number would increase every year till all were sufficiently large for the purpose.

The milk of this tree flows much more freely than that of the *Hevea*, so that one cut seems to drain a much larger area of the stem of its milk. The native methods of tapping are mostly very wasteful, and also often cause the death of the trees. Sometimes the method described under Para rubber, by cutting V incisions at frequent intervals, is used, and so far this seems to have been the only one used in Ceylon. We have found that the milk here runs so freely that a simple sloping cut is sufficient, and that there is no need to make a V. If this method is used the cuts need not be so close together as in *Hevea*; they may be 3 or 4 feet apart instead of 1. Sometimes the whole tree is cut down and incisions made in the bark as it lies on the ground. Other methods are to cut spiral grooves round the tree for some distance up, or to make a main channel on one side of the stem with lateral cuts leading into it. These methods are almost sure to kill the tree, at any rate after a few years, and only the first-mentioned, the method of simple incisions, should be used with cultivated trees.

(To be continued.)

The horse stable should have plenty of light, but the windows should be behind the horses. Don't force them to look constantly at a glare of light.

The Cappoquin Bacon Factory.

By LOUDON M. DOUGLAS,

Lecturer at the East of Scotland College of Agriculture, Edinburgh. Author of "Manual of the Pork Trade," "Douglas's Receipt Book for Bacon Curers," etc., etc., etc.

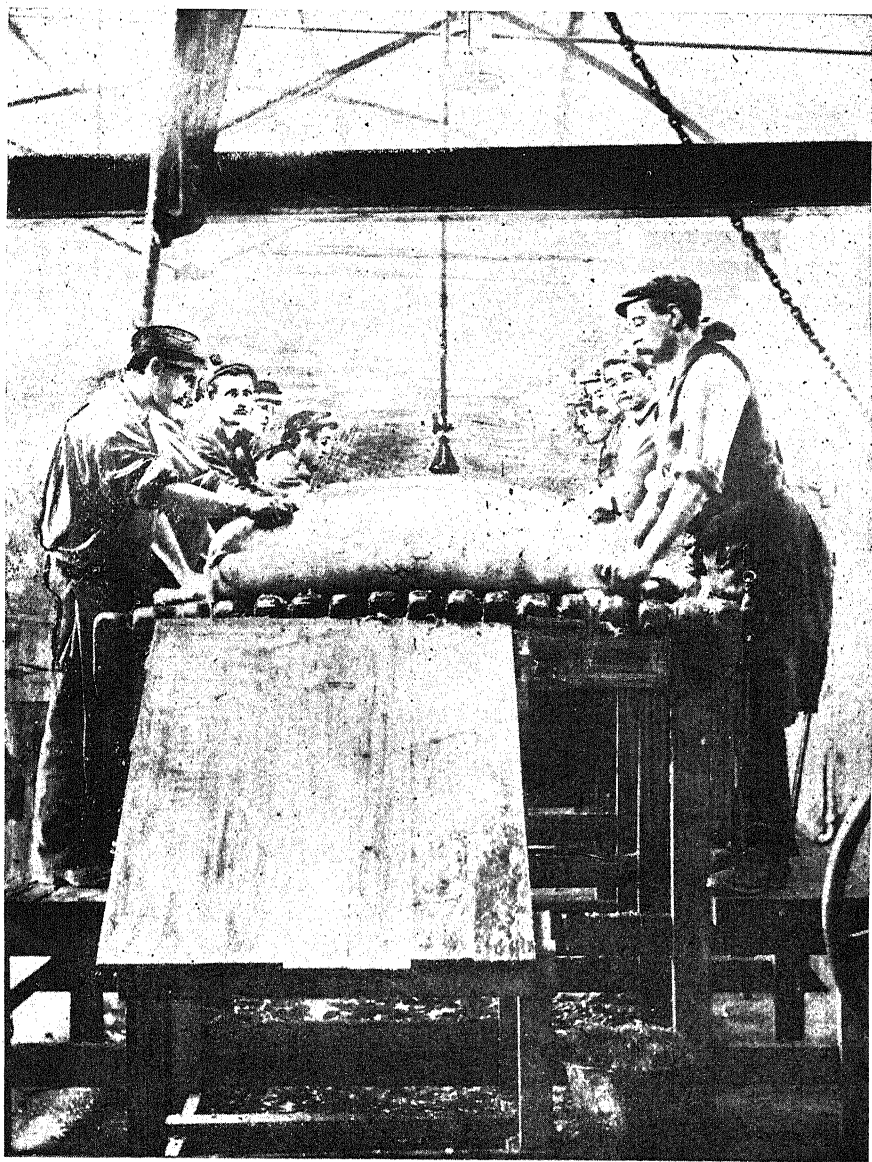
THE town of Cappoquin is pleasantly situated on the Black Water, near Lismore, Waterford, Ireland. At one time it was a considerable centre of industry, but for more than a generation it has been simply a market town in which inconsiderable fairs are held week by week.

Its ancient history is of interest because it would appear that during the seventeenth century it was the centre of considerable stir in the warlike expeditions of "The Great" Earl of Cork. Military operations in those days, however, do not appear to have been very imposing affairs, in spite of the solemnity with which we are informed, that in 1642 a certain Lord Broghill, on his return from the relief of Knockmoane with about sixty horse and 140 foot soldiers, defeated a party of insurgents, who were strongly posted in the vicinity of Cappoquin, because we learn that he accomplished this amazing military undertaking with the loss of only one man!

The town owes much to the first Earl of Cork, as it was he who built the original bridge over the Black Water, now replaced by a fine stone structure. The valley of the Black Water from Cappoquin to Lismore and down to the mouth of the river at Youghal is one of the most beautiful in Ireland, and, unhappily, very little known. From Youghal to Cappoquin the river is navigable for small vessels, a fact which may prove of considerable importance in the future development of the district.

The late Sir Richard Keane, of Cappoquin House, endeavoured, by fostering local industries, to try and make Cappoquin an important centre, and, during his time, corn mills and saw mills were in operation. Since then, however, the trend of such businesses has been towards the sea coast, and, as a consequence, inland places like Cappoquin have been in a great manner deserted. It is due to the present occupant of Cappoquin House—Mr. R. H. Keane—that at least one industry has again been established in the old town. Mr. Keane possesses the advantage of a thorough practical knowledge of agriculture, gained at Cirencester Agricultural College and also in practice on the large Home Farm attached to Cappoquin House, which he has converted into a splendid modern farm.

It occurred to Mr. Keane that pig-breeding, properly conducted,



CAPPOQUIN BACON FACTORY.—II.

Scraping the pigs on the scuttling table, after scalding.

should constitute a profitable department of modern agriculture. In his view it was not sufficiently developed in Ireland, and, bearing in mind the experience of such countries as Denmark and the great prosperity which had come to them through the industry of pig-breeding, it seemed likely that a similar result might be hoped for in Ireland. As a consequence, the Home Farm at Cappoquin has, during the last three years, been chiefly occupied with the breeding of pigs, which are kept in large numbers, about 1,000 being always in stock, this branch of farming being successfully carried on in conjunction with the cultivation of arable land, the breeding of sheep for mutton, and extensive dairy farming. The utilisation of the separated milk from the dairy farm for pig feeding is a leading feature, but not nearly sufficient is provided on the farm, and, as a consequence, large quantities are brought to Cappoquin from Dungarvan and other centres in County Waterford.

Pig-breeding and feeding in Ireland has, of course, always been a feature among the small farmers, but during recent years it has taken up a position of greater importance, and is now far removed from the category of casual occupations on the farm. Many private landowners are directing their attention to this department of agriculture in the same way as has been done at Cappoquin, and there can be no doubt that the result will be of great economic value in the agricultural development of the country, considering that the demand for pig products in the United Kingdom is steadily increasing.

For many years there has been a large export trade from Ireland to Great Britain in live pigs. In 1907 the number so exported totalled 431,907, or an average of about 10,000 per week. There is also at least a similar quantity exported in the shape of bacon, and when it is considered that the United Kingdom pays to foreign countries something like £19,000,000 sterling per annum for bacon and pig products, it will be seen that the supply of the Irish commodity is capable of being very much enlarged. The principal countries from which bacon is imported in Great Britain are—Denmark, Canada and the United States; and the latest agricultural returns from these countries show that there was in 1907 a very considerable increase in the pig supplies for that year, a fact which would lead us to suppose that British markets are being carefully studied by foreign breeders, and that the increasing demand for bacon warranted continued development in the pig-growing industry.

These considerations convinced Mr. Keane that not only might pig-breeding be successfully carried on in Cappoquin, but that bacon curing might also stand a chance of success. Accordingly, he made up his mind to utilise the old Cappoquin saw mill as a bacon factory, and in 1907 proceeded to have it transformed. In order to do this, he consulted Messrs. William Douglas & Sons, Ltd., Bacon Factory Engineers, of Putney, who designed and equipped the factory with their special

machinery and appliances throughout, acting also as architects in connection with the necessary building operations.

The factory has now been working for about a year, and has been able to show a completely successful record since its start.

The buildings are on two levels, the lower level (facing the Black Water) being devoted to pigsties, abattoir, smoke stores, curing cellars, boiler house and machinery room. On the higher level, which is nearly on the level of the main street of Cappoquin, there are a hanging house, chill room, sausage room, lard room and general offices. There is also a freezing room which is utilised by a local firm for the storing of poultry and game. The capacity of the factory is at present about 500 hogs per week, and at least this number is being handled week by week, and has frequently been exceeded, as opportunity arose for securing large supplies of pigs. These pigs, which form the raw material of this factory, are purchased, not only in the local markets, but a very considerable proportion of them are sent in direct from the farmers and landowners in the surrounding districts, who have been very loyal to the factory, and given it all the support they could since it started.

The process of making bacon has, during the last twenty years, been reduced to a science, and the period of rule-of-thumb operations which existed before that time has now passed away. The consequence is that the "cure" may now be reckoned upon with certainty, whereas previously much depended upon the individuals engaged in the handling of the meats.

At Cappoquin the pigs are brought in at the lower level and may also be landed from barges on the Black Water. They are paid for as delivered, and, after resting, pass through the abattoir, where they are killed and the offal and carcasses separated. The offal is handled so as to make the most of it, and fortunately there is a very large demand for offal products in the vicinity.

The carcasses are scalded, and the greater portion of the hair removed on the scuttling table. For singed bacon purposes the carcasses are then passed through a singeing stack, where the remainder of the hair is removed by burning, and, at the same time, the rind is shrivelled by the heat, such shrivelling imparting a particular flavour to the meat. The subcutaneous fat is momentarily melted also, and this ultimately becomes very hard in texture and gives firmness to the sides.

The Irish home trade in bacon is not for what are known as "Wiltshire sides," but for hams and middles; hence provision is also made for the production of these, and the singeing part of the process is omitted, as not being necessary for this trade. The processes for scalding, removing the hair, and removing the offal are identical, but from that point upwards they differ considerably.

It is after the *scalding* in the case of "hams and middles" pigs and

after the *singeing* in the case of pigs intended for "Wiltshire bacon" that the offal is removed. When the carcasses have been cleansed they are hoisted into a hanging loft, where the excess of animal heat is allowed to escape, and where, when partially cooled, the carcasses are divided into sides. The *secondary* offal, consisting of the head, feet and lard, is next removed, after which the sides are placed in the chill room, where, by the action of refrigerating machinery, they are reduced in temperature to about 38 deg. F. When this has been accomplished the sides are trimmed and are taken into the curing cellars, where they are pumped with a recognised pickle of fixed composition so that the curing material may come in contact with the tissues of the meat quickly. They are then laid down in stacks of ten sides, the one on top of the other, and as each one is so placed it is covered with an equal mixture of bacon-curing antiseptic and saltpetre, on the top of which a heavy layer of fine salt is distributed. In this condition the sides are "cured"—that is to say, the salt is melted by assimilation with the juices of the meat, and in this process a certain quantity of the liquid contents of the tissues is given up and runs away into receptacles provided for it in the cellar floors.

Curing is mainly a process of decomposition, and it is not sufficient to merely impregnate the tissues of meat with a solution of salt to produce bacon. Certain putrefactive germs are always present in dead meat, and curing is a process of destruction which is partially successful in breaking down some of the tissues of the meat, irrespective of the presence of salt (which is not antiseptic to many of the germs), and in arresting the destruction of other tissues. Hence the flavour of the bacon produced, which is so different from that of fresh meat.

The ordinary cure for a "Wiltshire sides" extends to about twelve or fourteen days, but the exigencies of trade often demand that this should be curtailed, and, as a consequence, bacon is frequently placed on the market which has only been in salt six or seven days. It is obvious, however, that the flavour of such meat cannot be so good as that which is kept for the full period. When the Wiltshire curing is completed the bacon is washed, packed in bales of various sizes, and sent away to the British markets; or it may be smoked, and similarly sent, in the smoked condition. Where the carcasses have been prepared as hams, or middles, and fore-ends, or other descriptions known in local trade, there are variations in the details of curing, as also in the treatment of heads, houghs, feet and other secondary offal, which have to be cured and prepared for various markets, though the curing principles remain the same throughout.

Two departments in a bacon factory which involve the exercise of much skill are those concerned with sausage-making and lard-rendering.

The Cappoquin sausages have been sent to many parts of the coun-

try, as have also the minor products of black and white puddings, brawn, etc., and have earned for themselves a reputation as being of excellent quality. So also in the lard department, much success has been achieved and an extensive demand created.

It goes without saying that the machinery and appliances in such a factory are of the very best possible kind. The engineers who are responsible for the factory have devoted something like a quarter of a century as specialists to the manufacture of the various appliances necessary in bacon factories, and brought them to great perfection. The principal requirements are a boiler and engine, along with powerful refrigerating machinery (which latter is applied so as to maintain the cellars at about 42 deg. F. and the chill-room at 38 deg. F.), and the various appliances used in sausage and lard-making. There are, of course, many minor details which enter into the successful equipment of a modern bacon factory, the uses and necessity for which can only be learned by intimate acquaintance.

On the whole, it is satisfactory to be able to say that the Cappoquin venture has met with considerable success, and the factory should be instrumental in demonstrating to others that the industry of bacon curing can be carried on as successfully in Ireland as elsewhere. The demand for its produce also shows that there is room for many such factories, in addition to which it should be borne in mind that the demand for pig products in Great Britain is extensive and is very much upon the increase.

It only remains to add that to make a permanent success of the venture much will depend upon the management, and it is satisfactory to know that Mr. Keane, while taking a continuously active part in the administration of the factory himself, has the assistance of a skilled and capable manager in Mr. T. G. Mansfield, who was for many years associated with the largest bacon factory in Cork. The general staff of the factory, also, are well up to their work, and have, all in their own particular way, contributed to the prosperity which the factory has so far attained.

The following addition to the Regulations under the Coast Fisheries Act, 1906, as published under Government Notice No. 17, 1907, has been made by the Governor in Council, in pursuance of Section 32 of the Act:—16a.—The taking, capture or destruction of Shrimps, Prawns, Crabs or Crayfish by torchlight or under the attraction of any other form of artificial light, except by persons duly licensed to capture such crustacea, is forbidden.

A Year Among the Orchards of Nova Scotia.

By CECIL H. HOOPER

(A Paper Read before the Royal Horticultural Society, London.)

(Continued.)

NOTES OF THE YIELDS OF FRUIT.

At Cornwallis Rectory there is an old French Nonpareil apple tree probably 150 years old, measuring 10 feet girth one foot from the ground. The Rector, the Rev. F. J. H. Axford, told me that during the 20 years he has been there the amount of fruit from it has varied from two barrels up to 16, the average being nine barrels.

At Wolfville, in 1896, from Mr. Elliott Smith's orchard, 20 barrels were gathered from three Gravenstein trees 25 years old. In the same year from the farms on Canard Street, 50,000 barrels of apples were gathered within a distance of $2\frac{1}{2}$ miles along the road.

In the Gaspereaux Valley 1,700 barrels were gathered from 13 acres of orchard belonging to Mr. Gutridge.

Strawberries, 100 bushels or 3,200 quarters per acre. I was informed, was an average yield, 5,000 being exceptionally good. Price usually 5d. to $7\frac{1}{2}$ d. per quart, but sometimes as low as $2\frac{1}{2}$ d. Strawberries are grown on the "matted row" system.

Raspberries, 2,000 quarts average, 5,000 very good; price 4d. to 6d. per quart.

Blackberries, 2,000 average, about the same price as raspberries.

Cranberries, 50 to 100 barrels of 150 lbs. Price 25s. to 30s.

Price paid for picking all berries, $\frac{1}{2}$ d. per quart.

Potatoes are extensively grown and exported to Cuba. Burbanks, early and late Rose and Chilis are among the varieties most grown. The average yield is about 200 bushels per acre, price varying from 1s. 3d. to 3s., according to season.

VARIETIES OF FRUIT CHIEFLY GROWN IN NOVA SCOTIA.

Apples.—Gravenstein and Banks' Red Gravenstein are fit for shipping about the middle of September. Baldwin, the most widely grown of any variety. King of Tompkins County, very high quality, but rather shy bearer. Nonpareil commands a very high price, which is in its prime in the following May or June; it is mostly grown in Annapolis County. Ribstone Pippin, the best apple of English origin. Golden Russet com-

mands the highest price, but shy, needs high feeding. Ben Davis still sells fairly well, but is poorer than the Western Ben Davis. Northern Spy. The Bishop Pippin or Belle Fleur, introduced by Bishop Inglis, the first Bishop of Nova Scotia, is much grown for home use, but does not stand shipping. Blenheim Orange, one of the most popular; both leaves and fruit very free from "scab." Fallawater. Rhode Island Greening.

Pears.—Bartlett or Williams' Bon Chretien, Clapp's Favorite, Flemish Beauty, as standards. (In Ontario, Duchesse d'Angouleme is much grown as a dwarf.)

Peaches.—Early Crosby and Early Alexander.

Plums.—Moer's Arctic, Lombard, Greengage, Magnum Bonum, and Bradshaw. The wood of the European and American varieties are subject to a very destructive fungoid disease, "Black Knott" (*Plowrightia morbosa*), which I trust we may never get in England, but from this disease the Japanese varieties are almost entirely free. Burbank, Wickson and Abundance are the most popular Japanese sorts.

Gooseberries and Currants are but little grown. The American varieties of gooseberry are small, the best being the Downing. English varieties of gooseberry are so susceptible to the American gooseberry mildew that they are very little grown. Red currants fruit well, but black currants do not thrive.

Raspberries.—Cuthbert, Marlborough, both of American origin.

Blackberries.—Snyder, of American origin.

Straubberries.—Wilson's and Crescent Seedlings are mostly grown in alternate rows; Parker Earle, a new variety, is highly recommended. European varieties do not thrive on the American Continent.

Cherries are largely grown around Bear River and Digby; it is a district in which wild cherry and oaks grow naturally in the woods. Black and White Hearts and French are the varieties mostly grown.

Cranberries are obtained wild from the North Mountain and near the lakes.

ORCHARD IMPLEMENTS.

Some of the best orchard implements I saw in use in Nova Scotia were:—

Pomonea Pump (Gould's Manufacturing Co., Seneca Falls, New York).

Eclipse Pump (Morrill & Morley, Benton Harbour, Michigan). Both of these pumps have hard brass working parts complete, fitted on a 40-gallon barrel, with hose, bamboo rod, and double Vermorel nozzle, £3 15s.; carriage to London, singly, about 24s.

The Spray Motor Pump, manufactured by the Spray Motor Co., of London, Ontario, is probably the most largely used of any pump now

on the market in the Province. Several power sprayers made by this company, and run by a gasoline engine, are also in use.

Orchard Spring Tooth Harrow (Syracuse Chilled Co., Syracuse, N.Y.), £3 15s.

As an example to us in co-operation amongst farmers and Government aid to agriculture, I will give a short account of the work of the Nova Scotia Fruit Growers' Association, its School of Horticulture, the Nova Scotia Office of Agriculture, and the Canadian Government Department of Agriculture.

THE NOVA SCOTIA FRUIT GROWERS' ASSOCIATION

was formed in 1863, when the acreage under fruit was probably about 2,500 acres. In 1893 it was estimated that there were 12,000 acres of bearing orchard, with 8,000 more of young trees. In 1871 apples were first sent to England. In 1896, a good year, it is estimated that 750,000 barrels were produced, of which 450,000 were exported to England, and 500,000 barrels in 1904. It is estimated that there are two million apple trees in Nova Scotia, and that not 10 per cent. of the land suitable for apple culture has yet been planted. The Association has for its objects:

The increase of cultivation of the various kinds of fruit.

The spreading of information as to the best methods of cultivating, packing and shipping fruit.

The discussion of subjects of mutual interest, as freight rates by rail and steamer, ventilation on steamer, handling of barrels on embarking and disembarking to prevent damage, condition of fruit on arrival in markets, possible new markets.

Once a year, in February, it has a three days' session at Wolfville, at which papers are read and discussed. I attended it in 1898, and thought it must be very valuable to the farmers, who attend in large numbers. Each member receives the printed report. The yearly subscription is a dollar (4s. 2d.). The Secretary is S. C. Parker, Berwick, Nova Scotia.

At the Halifax Industrial Exhibition in October there was a fine exhibition of apples, plums, cherries, peaches and grapes from Nova Scotia and New Brunswick under the management of the Association.

THE NOVA SCOTIA SCHOOL OF HORTICULTURE

was established at Wolfville in 1894 by the Nova Scotia Fruit Growers' Association, assisted by a Government grant. Horticulture, Botany and Microscopic Botany are taught by an able professor, F. C. Sears. The School consists of a class-room with a good collection of English, Canadian, and American books on Horticulture, Horticultural journals, about twelve good microscopes, and a collection of pressed wild plants. Beneath the class-room is a potting-shed, or workshop, and adjoining a glass house with economic and ornamental plants and flowers, in which

grafting, budding and propagation can be taught during winter. There is also a root-cellar, in which apple stocks for root-grafting during winter are kept. Surrounding the school are ornamental grounds, with a nursery of young fruit and other trees and plants close by.

The horticultural course is at present confined mostly to the propagation of plants and to fruit-growing, dealing with wind-breaks, protection from frost, setting out and planting, tillage, manuring, cover crops, renovation of old orchards, grafting, budding, the life histories of fungi and insects, spraying, harvesting and packing of the fruit, cold storage, etc. The School of Horticulture is attached to the Wolfville University.

The classes are held during the winter months from November to the end of April. Having myself attended the course, I cannot speak too highly of it.

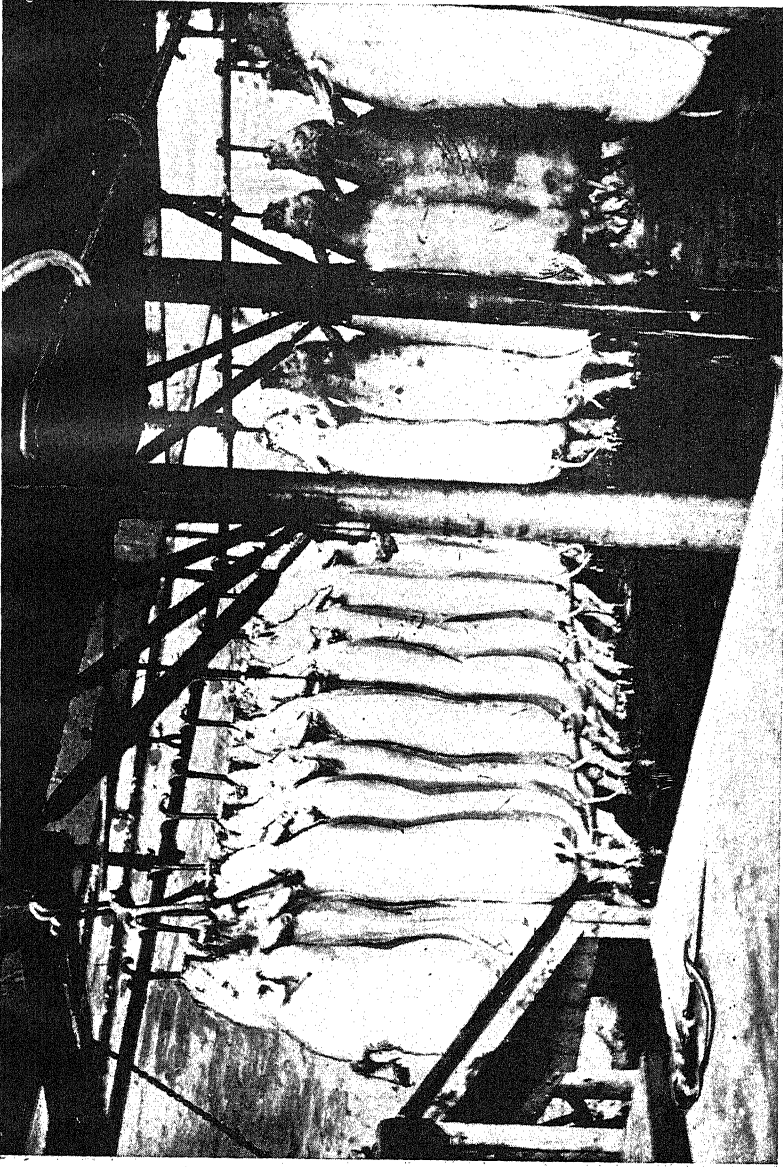
The course is free, and farmers are invited to come and look round at any time, attend any lecture, and bring any questions. Although there are such exceptional advantages, there are but few who attend regularly.

The following were the Text Books used at the School of Horticulture in winter, 1897-8 (they are excellent books):—

“The Principles of Fruit Growing,” by Prof. L. H. Bailey, of Cornell University; “The Spraying of Plants,” by E. G. Lodeman; “The Nursery Book,” by Prof. Bailey; “The Pruning Book,” by Prof. Bailey; all published by the Macmillan Co., New York and London. Price about 5s. each.

The milk stool should be used to sit on and not to pound the cow with.

It may not be known to every reader that 1 inch of rain represents 100 tons per acre, and that 30 inches means 3,000 tons per acre, or, to be still more sensational, 300,000 tons of water on 100 acres of land in each year. Such are, however, the absolute facts, and show very clearly how futile would be our efforts to “water” our fields as the gardener waters his little plots. To calculate the vast amount of water which falls upon the square mile of country in the course of a year would be easy, but the weight of water thus precipitated would be beyond the powers of imagination to grasp.



CAPPOQUIN BACON FACTORY.—III.

The singeing furnace is an important appliance in preparing "Wiltshire" bacon. The pigs after being scalded and partially/scraped are hoisted up through the singeing furnace head first. There they are burned for about a quarter of a minute, and then are withdrawn when they present a very black appearance. They are then scraped and cleansed.

Molasses for Horses.

SUMMARIES OF OBSERVATIONS.

IN our January issue we published a letter from the Managing Director, The Molassine Co., Ltd. (Mr. R. H. Ebstein), on the subject of the feeding value of molasses for horses; and with his letter Mr. Ebstein forwarded a copy of a brochure by Col. Nunn, the P.V.O. of the British Army in South Africa, on sugar foods. We have at various times published information regarding the value of molasses for stock, and some of the points referred to by Col. Nunn will be found of much value by those interested in the question of feeding molasses.

The advantages of sugar-feeding for broken-winded horses have long been known, and Col. Nunn publishes a summary of the observations which have from time to time been made by various authorities on the subject.

Mr. Trasbot a long time ago recommended the mixture of a certain amount of molasses in the feed of broken-winded horses. He says: "Molasses assists and regulates the respiration, which is deranged in cases of broken wind, and gives the animals a brilliant coat as well as a healthy appearance."

M. Cornevin says: "Molasses is not only useful as a food, but also is a highly valuable therapeutic agent in those cases of disorganised respiration known as a 'broken wind,' which are so common. For a long time it has been known that sugar and honey improved the condition of broken-winded horses, and in the last century several practitioners, amongst whom I may mention M. Mannechez, veterinary surgeon, of Arras, and M. Decrombecque, of Sens, pointed out how molasses mixed in the food improved the condition of broken-winded horses. M. Dechambre, in his report to the Food Congress of 1889, points out the same as a preventive in intestinal diseases: (1) increase of appetite and power of digestion; (2) as a slight laxative and stimulant in cases of atony of the intestine."

A German agriculturist, M. G. Goertz, whose horses were very hard worked, remarks: "Although well fed, my horses carried dull coats, and looked bad, also were constantly subject to colic; but the use of molasses in their food has been most successful, their coats now looking bright and well, and there is a complete disappearance of colic from amongst them."

All the working horses received their ordinary feed of oats and beans, of which 500 grammes (about 1 lb.) were replaced by 1 kilogramme (2·20 lbs.) of Molassine Meal. In about three days they got used to the

change, and ate it greedily. One day, the Molassine Meal being omitted, they fed badly. It was also noticed that attacks of colic diminished, and certain horses that had been subject to this complaint greatly improved in condition. During the past two years there has not been a serious case of colic, and only one slight one, which recovered in an hour. Furthermore, it was noticed that all the horses' coats improved, particularly those that were employed on the land, and they fed well. During the hard work of the autumn and winter carting beetroots 1-500 kilogrammes (3-80 lbs.) of Molassine Meal were given (Grandeau).

The following extract is taken from the "Instructions for Feeding Horses on Active Service in the German Army": "As Molassine Meal increases the appetite and stimulates digestion, it is recommended for use after autumn manœuvres as a preventive against colic."

In large studs of working horses the two chief causes of colic are overwork and overfeeding, and the greater number of deaths is due to disease of the digestive system, 75 per cent., whereas it has been proved that where sugar-feeding is practised, it has been reduced to from 40 to 50 per cent. of the total. Nearly all veterinary surgeons agree that it has a beneficial effect on the coat and general state of health and condition, while at the same time it increases the capacity of work.

Being a stimulant of both appetite and digestion, sugar is *par excellence* a food for horses that are convalescent from digestive troubles with loss of appetite, as well as those of the upper air passages, in which latter cases it can be advantageously combined with honey.

For sick animals that are unable to work, such as on recovery from an operation, sugar with a certain amount of hay is ample. It furthermore seems to prevent laminitis and congestion of the feet, which is so likely to come on with prolonged confinement to the stable, and, at the same time, is cheaper than the usual grain, bran, and hay ration.

Sugar is not only the chief source of muscular force and heat, but also a most important factor in the formation of fat in cattle, as has been shown by the experiments of MM. Mareker, Zimmermann & Albert, and it is well known that sugar is forbidden in the regime of persons undergoing treatment for obesity; and in sugar plantations, when the cane is being cut, the native labourers are in the habit of eating it, and at this season of the year greatly increase in size.

M. Grandeau is of opinion that sugar is of the highest value in fattening stock, always provided that a sufficiency of nitrogenous material is supplied in conjunction with it, and M. Sanson has noted that heifers have greatly increased in weight when fed on it.

M. Malhevre points out that with pigs sugar not only increases weight, but the bacon cures better and firmer, and M. Dechambre has observed the same with sheep.

The value of cake molasses having been proved, 1 kilogramme 2.20 lbs. per head of Molassine Meal was fed to the working cattle daily, gradually increased to 2.500 kilogrammes (5.50 lbs.); but this quantity did not agree with them, and had to be reduced to 2 kilogrammes (4.40 lbs.). The animals, which were then at work both at the plough and harrow, did well on it, and their skins greatly improved in condition.

Young Stock.—Young animals from two to three years old that were fattening were profitably fed on 1.500 kilogrammes (3.30 lbs.) per diem of Molassine Meal. The use of crude molasses with beetroot leaves is not advisable on account of the large quantity of salts contained, but the admixture of peat moss decreases cases of diarrhœa. The quantity of from 250 to 350 grammes ($\frac{1}{2}$ to $\frac{3}{4}$ lbs.) can be given to young stock with profit.

Milk Cows.—Since November, cows that have calved have been kept separate, and, in addition to their ordinary feed, have, for the last two years, been getting 2 kilogrammes (4.40 lbs. of Molassine Meal. The quantity of the milk was increased, and the quality improved, and the animals were in perfect health and condition.

M. P. Hoppe has made an exhaustive series of experiments at the University of Leipsic into the value of molasses in feeding milking cows. Those used for the experiment were fed 2.500 kilogrammes (5.50 lbs.) per head per diem. It was found to increase the quantity of milk, but if 2.500 kilogrammes were exceeded the quantity of butter was diminished, but not the percentage of casein, and the taste of both milk and butter was not affected in this way.

M. A. Gultmann says: "Last year I fattened 945 bullocks for the Moscow market on 5 kilogrammes (about 11 lbs.) of molasses per head per diem in an average of ninety days."

M. Miserez, who was deputed by the Agricultural Society of Herzele, East Flanders, to report on the matter, has arrived at the following conclusions:—

1. Molasses is a most wholesome food, greatly relished by cattle; it increases the quantity of milk, and improves its quality.

2. The use of molasses has allowed the food to be increased in a ratio of 1.5, without any detrimental effects either to the milk or butter.

These numerous experiments show how advantageously molasses may be employed in replacing a portion of cake, the use of which is attended with certain difficulties. The method by which oil-cakes are manufactured is most important. Those in which sulphuric acid and other chemicals have been used should be discarded, as they are likely to cause gastro-enteritis. The excessive use of cotton cake, both decorticated and undecorticated, is dangerous, and will cause slow poisoning and abortion; and certain others, especially those made from plants belonging to the

natural order *Cruciferae* (mustard, rape, etc.), impart a disagreeable smell and colour to the meat, milk, and butter.

By sugar-feeding animals fatten quicker, and in the case of working oxen will be in better condition for the butcher if, by reason of an accident or for any other cause, slaughter is necessary; they also fatten quicker if for any other reason it is necessary to take them out of work and use them for this purpose. In the preparation of feeding cakes there is in a certain amount of fraud practised by unscrupulous persons, and some samples are on the market which, if not perilously noxious—as sometimes is the case—consist of rubbish, which is sold at the price of the genuine articles. The use of molasses will prevent such useless stuff being palmed off on the stock-owner, and not only save his pocket, but prevent loss through deterioration in quality of meat, milk, or butter.

The most important means of perfecting a breed after careful selection of parents is a rational system of feeding, and the English saying that “Breeding is produced through the mouth” should guide us, as England stands first in the production of stud animals of all sorts.

Breeders are still too prone to feed their stock by rule of thumb, and under an irrational system of feeding animals have little powers of resistance to disease, the result being bad both from a hygienic and economic point of view.

Sugar-feeding is the most practical remedy, not only from the butcher's but also the dairyman's point of view, as well as a valuable preventive to certain diseases and accidents caused by cakes, pulps, brewer's grains, or damaged food of any description.

Notwithstanding these remarks, the conclusion must be jumped at that sugar can be substituted entirely for the grain ration. A certain proportion is absolutely necessary, as it contains the phosphates and nitrogenous constituents that are essential for the repair of the tissues, especially the bones.

According to Marcker & Albert, overfeeding on molasses (say 6 kilogrammes, 13.20 lbs.) has a deleterious effect on the bones. During the course of their experiments one of their subjects died, and Marcker attributed the cause to want of lime and phosphoric acid, also to the formation of acids in the digestive system, which, by lowering the degree of alkalinity in the blood, acted as a solvent on the phosphate of lime in the bones. Marcker added 50 grammes (about 1 lb.) of phosphate per head per diem to the ration of molasses, and the trouble ceased; and he advises, if more than 4 kilogrammes (8.80 lbs.) per 1,000 kilogrammes (2,200 lbs.) live weight is fed, the giving of 100 grammes (2.20 lbs.) of bi-basic phosphates per 100 kilogrammes (220 lbs.) live weight. This is most important, and is deserving of consideration by all stock-owners.

This system of feeding being in its infancy in France, large quantities should be given, as its effect on the bones is not quite understood, and only by experiment can this be accurately determined. Nevertheless, a large number of observations have been made, and have, beyond doubt, established the fact that if used judiciously nothing is to be feared on this score from sugar.

The proportion of mineral salts given with molasses require careful attention. All the salts contained in the cane juice are also found in molasses; they are chiefly those of potash and complex organic acids in a proportion of from 10 to 11 per cent., and require to be carefully considered.

Developing the Meat Industry.

LECTURE BY MR. LOUDON M. DOUGLAS.

A LECTURE was given at Coventry recently by Mr. Loudon M. Douglas, of the College of Agriculture, Edinburgh, on the subject of the Development of the Meat Industry. There was a large audience present, amongst whom were the Medical Officer's staff and the members of the Meat Purveyors' Association of Coventry and the surrounding towns. The chair was occupied by the Mayor, Mr. Alderman Lee.

Professor Douglas referred at the outset to the fact that Coventry still had the system of private slaughter houses, which would, it was to be hoped, give place in due time to a central abattoir.

The early history of the meat trade was wrapt in obscurity and the first attempt to regularise the business was under the Mosaic law. Since that period very little had been done by way of putting our principal food supply upon a satisfactory basis. In ancient times the slaughter of animals was carried out by the priest, and it was forbidden to consume the blood, because it was looked upon as the "seat of the soul." Even as late as 300 A.D. the Romans carried out the slaughtering in the Forum under the eyes of the gods, but from that time a gradual change came over the whole business. During the middle ages the Trade Guilds sprang into existence, and one of the most powerful leagues was the Fleshers' Guild, which was represented in every town of any consequence. The Guilds became so powerful that they ultimately controlled the municipalities, and as a matter of fact began to abuse their power. In 1835 they were abolished, and from that date on to 1888 there was no regulation of the meat industry at all.

At that date the National Federation of Meat Traders' Associations came into existence, and it had become, in so far as the United Kingdom was concerned, a national institution, which had about 20,000 members, amongst whom were the leading meat purveyors in the country. This federation had formulated certain demands which had not yet been granted, but there was every prospect of that being accomplished in the near future. These demands were that provision should be made for the humane treatment of live stock in transit on land and sea. It was asked that compensation should be paid for the carcasses of animals confiscated because of the discovery of tuberculosis on *post-mortem* examination. In so far as private slaughter houses were concerned, the federation did not oppose their being abolished, but they required compensation for such, as this general action was stated to be in the public interest. The meat purveyors also demanded a uniform system of meat inspection, and quite lately they further demanded a warrant from farmers with the live stock that they sold in open market.

Although none of these demands have so far been satisfied, the organisation of Meat Traders' Associations had become so extensive throughout the United Kingdom that there was very little doubt but that legislation would follow upon the lines desired. The principal interest lay in the subject of technical education, as the meat purveyors recognised that, while they handled the principal food supply of the nation, no opportunities had ever been offered them of acquiring a knowledge of the technique of the business. Hence, they were at a disadvantage in comparison with meat inspectors who were placed over them.

The first academic course that had been instituted in the United Kingdom was started at the College of Agriculture, Edinburgh, and had been completely successful, and it had given rise to the general desire for similar courses throughout the country. There was no reason why the meat trade, with all its various technical details, should not be on as high a level as any other profession in the country, and there was little doubt that if the present agitation was continued but that such a desirable end would be reached.

The lecture was illustrated with demonstrations of the use of humane slaughtering apparatus and also with a large assortment of lantern pictures, which were followed with great interest by all present.

Don't throw money away by feeding a lot of culls and drones. Also remember that old hens do not lay nor pay so well as pullets or yearling hens.

Export of Fruit.

SOME USEFUL HINTS AND INFORMATION.

THE Cape Department of Agriculture has recently issued a circular to fruit growers containing a large amount of valuable information relative to the requirements of the London market, the kinds of fruit to export, and so forth; and, in view of the interest which this subject has for fruit growers in Natal at the present time, we think no apology is needed for reproducing the circular in full.

The circular is as follows:—

It has been decided by the Department of Agriculture, with the concurrence of representatives of all branches of the fruit export trade, that the Government scheme for the export of fruit in operation during the past two seasons shall be discontinued. It will therefore be necessary for all shippers during the forthcoming season to make provisions for the sale of their fruit through agencies appointed at their own instance in London, but the Department of Agriculture will continue to extend to the industry such measure of advice and encouragement as may be essential. It is not intended that itinerant instructors in fruit packing shall be employed at the instance of the Government in future, and the following notes on the various factors which enter into the successful preparation of Cape fruits for oversea markets are prepared with a view to placing before the farmers of the Colony the results of the past two years' experimental work.

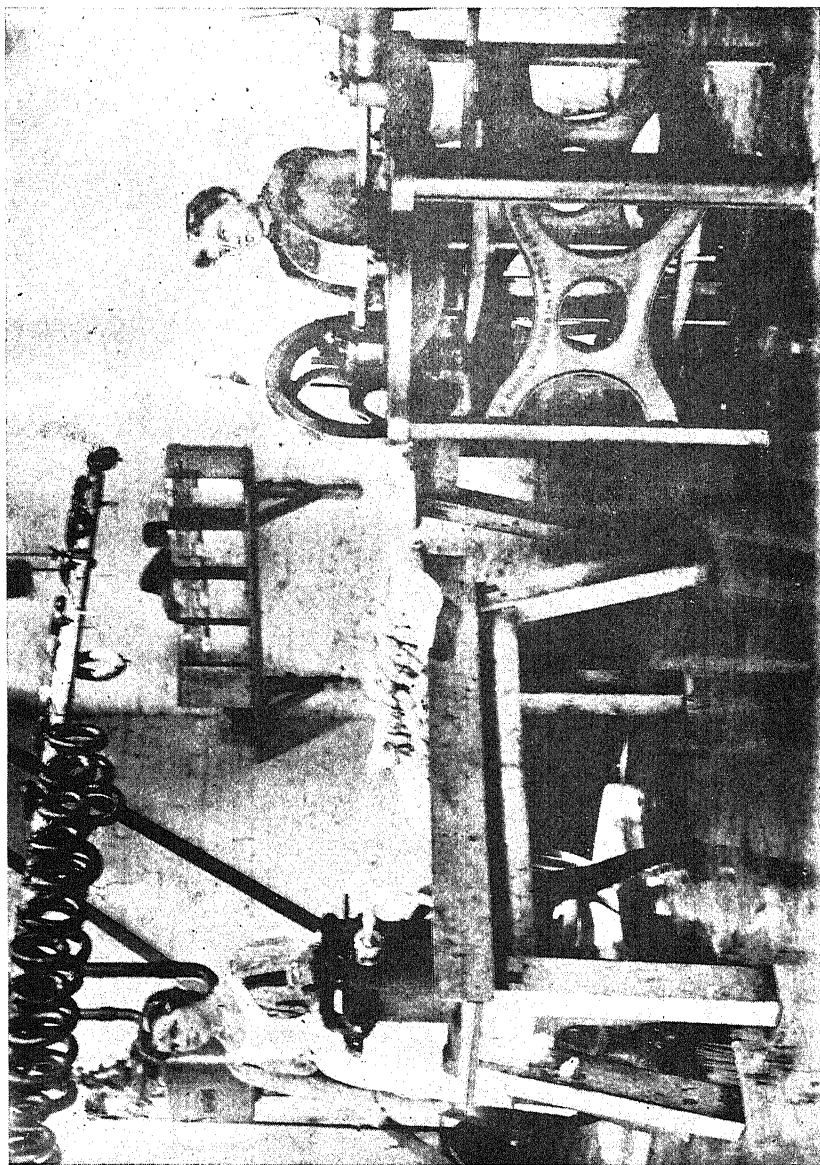
It may be laid down at once as a fundamental principle governing the whole fruit export trade that *only fruit of the very highest quality* can, with any hope of profit, be exported: and it cannot be too strongly urged that the standard of excellence must be in accordance with the judgment of European markets, and not the judgment of the South African grower. Frequently, during the past two seasons, fruit growers, with considerable show of reason, contended that their products were of an exceptional character, but unfortunately it was but too often discovered that the article when placed upon the market was regarded by the consumer from an altogether different point of view, with considerable financial loss to the shipper. Moreover, not merely must the variety be suitable, but the selection of the fruit itself must receive the closest attention, and every process affecting its selection, packing and transport must be attended to with the most scrupulous care.

In view of these considerations the following rules are laid down at the outset for the guidance of all who propose to place Cape fruit on European markets.

- I. The BEST FRUIT, and the HIGHEST QUALITY ONLY, must be shipped.
- II. The export trade should only embrace those varieties approved of in European markets.
- III. Fruit must not merely be of the HIGHEST QUALITY, and the APPROVED VARIETY, but must be uniform in size, degree of ripeness and colour.
- IV. The selection of export fruit *must rigorously exclude all marked or injured fruits*, and in the case of grapes, small, broken or unripe berries.
- V. The packages and packing material must be of the sizes and quality as nearly as possible hereafter described.
- VI. The *branding of boxes* must be strictly attended to.
- VII. The climatic conditions affecting the picking of fruit must be constantly kept in view.
- VIII. In order to reduce the period of time in cold storage to a minimum, the instructions hereafter laid down must be strictly observed.
- IX. The loading of fruits at railway stations and sidings should be personally supervised by the shipper.

I. *Quality of Fruit.*—The reports of the Trades' Commissioner on the shipments of the past season, as well as the special reports of the various agents of the Fruit Exporters' Association and private shippers, indicate a deplorable lack of accurate knowledge as to the quality of fruit fit for shipment in the Colony. Notwithstanding the fact that the general reports of the Trades' Commissioner constantly call attention to the inferior quality of a large percentage of the fruit consigned to London for distribution in Great Britain and on the Continent (and the special reports to individual shippers constantly emphasise the same points), fruit falling considerably short of the standard required was still sent forward. It cannot be too earnestly impressed upon all fruit growers that the person who pays the piper calls for the tune, and that therefore the South African opinion of export fruit is not by any means final, and the closest attention must be paid to every suggestion of defective standards reported by the Government representative and shippers' own agents.

II. *Varieties of Fruit.*—The Trades' Commissioner, having given the most careful attention to the market conditions during the past two seasons, and after constant consultation with the principal fruit factors in Great Britain, supplies the following information on the varieties of fruit most likely to prove remunerative for export. The varieties set down are as nearly as possible placed in the order of their popularity, and shippers should have the most careful regard to this order of precedence in preparation and packing.



THE CAPOQUIN BACON FACTORY.—IV.

The sausage room, where many of the fresh trimmings and other valuable portions of the carcasses are converted into

1. PLUMS.

"Satsuma." "Kelsey." "Wickson." "Apple."

The "Satsuma" has been in particular demand, although a very limited quantity of this variety has been forwarded from the Cape. In the plum trade every effort should be made to produce large fruits of the most attractive colours.

"Burbanks" are generally condemned as unsuitable, and should not be exported.

2. PEACHES.

"Early Alexander." "Waterloo." "Brigg's Red May." "Cape varieties of the red melting type of freestone."

The two following varieties are popular with the trade, but must be good samples:—

"Royal George." "Gladstone."

In the peach trade the grower must make himself acquainted with the requirements of the market, and strictly comply with the instructions of those engaged in distribution. The joint opinion of the leading members of the London fruit trade is that any variety of peach to which the following description may be applied can be shipped:—

"The market requires a fairly large peach, as round and with as much colour as possible. It must have a white flesh and must be a freestone. There is not the slightest use shipping a yellow peach, no matter how good its flavour is. Any fruit with a poor colour, or a long point, is quite unsuitable."

It is to be hoped that shippers will give the most careful attention to these points as during the past season large quantities of peaches were put upon the market wholly undesirable in the European trade.

3. PEARS.

"Bon Chretien." "Comice," or under its Cape names Buerrc du Bois, Flemish Beauty and Rustenburg. "Louise Bonne." "Beurre Rose." "Winter Nelis." "Beurre Hardy." "Glout Morceau." "D'Angouleme." "Clairgeau" is recommended, but should be branded "stewing." "Souvenir du Congres" is popular but second grade. "Easter" is thought to be too late. "Clapps' Favourite."

4. GRAPES.

During the past season Barbarossa made the highest prices and travelled well.

Hernitage was in good demand, but there was a general complaint that the berries were too small.

Red Hanepoot was much sought for, but the colour must be good, and all small berries removed from the bunches before packing.

White Hanepoot does not usually reach the market with a sufficiently attractive appearance.

Neither Red nor White Hanepoot travel as well as other varieties of Cape grapes.

Raisin Blanc travelled well, and generally reached the market in sound condition.

"Black Prince" grapes must not be shipped, and the small white variety called "French Grape" is quite unfit for export.

The order of varieties is placed thus:—

Barbarossa. Red Hanepoot. Hermitage. Raisin Blanc.

5. MELONS.

It will be necessary to make further experiments on the most favourable cold storage temperature for the oversea transport of melons, but during the past season the "Winter Melon" and a variety called "Bejudeire" travelled best and secured highest prices. Both are smooth skinned varieties. All melons of the "laced" or "netted" kind arrived in bad condition. Shippers must pay particular attention to the size of this fruit in demand in the market, as a large quantity exported in 1908 were either too small or too large. The fruits should be from four to six inches in diameter, and anything varying considerably from this dimension should not be shipped. European markets are not prepared to take large quantities of melons, and the shipments during the forthcoming season should not exceed 200 cases per week.

With reference to apricots, it is strongly impressed upon all shippers that this fruit is not regarded as a first-class dessert, and that inferior apricots are largely used for cooking purposes. There is, however, always a demand for a limited quantity of large and well-coloured fruit for dessert purposes, but Mr. Chiappini limits the weekly demand for the London trade for the fruit eligible for this class to 500 cases per week.

So far as miscellaneous fruits such as quinces, pomegranates and grenadillas are concerned, it is not suggested that a large trade can, at least for some time to come, be developed. Limited quantities are acceptable, and if carefully selected and well coloured will have a profitable sale, but they must be of such appearance as will commend them as much for table decoration as for actual use.

III. *Selection of Fruit.*—In the selection of fruit the special points to be attended to are:—

- (a) The degree of ripeness must as nearly as possible be determined with a view to the fruit being presented for sale after the oversea journey in the most attractive manner. It is extremely difficult to lay down rules which may be of any practical use to fruit growers on the ripeness of fruit for packing, and the only suggestion which can be made here is that fruit farmers who have already very

little or no experience of the preparation of fruit for export should visit those packers who have been engaged in the industry for years, and who will be quite willing to afford practical demonstration based on results of experience.

- (b) The condition of all fruit intended for shipment must be as nearly perfect as possible. The fruit must be quite sound, free from marks or deformities of any kind, and true to type.
- (c) The size must not be less than the dimensions given in the appendix attached to this bulletin which sets forth the minimum sizes for each kind of fruit.
- (d) Uniformity from every point of view must be strictly adhered to with reference to the size, colour and shape, so that a package when opened will present as neat and regular appearance as possible.
- (e) In the case of grapes, it must once and for all be understood that the thinning of bunches is absolutely imperative, the experience of past seasons being that a handsome bunch with comparatively few berries, but of good size, fairly loose on the stalk and well coloured fetched far higher prices than thickly-loaded bunches of uneven-sized berries.
- (f) In picking grapes laterals must always remain attached to the main stem of the bunch—that is, a small piece of the stalk on either side of the stem bearing the grapes must be allowed to adhere to the stem itself.
- (g) In the case of all fruits, bad, weak, small, badly-coloured and unripe fruits or berries must be absolutely excluded.

(To be continued.)

Working with good machinery is a pleasure. When you get an implement get the best, and keep it in prime shape.

In breeding stock of all kinds the best results are reached through the watchful eye and willing hand directed by skill and judgment involved in breeding and feeding.



Orchard Notes.

APRIL.

The Citrus Orchard.

No more important matter can occupy the minds of the majority of Natal fruit-growers during the month of April than that of preparedness for harvesting the citrus crop. More particularly should this be the case with those who contemplate exporting either to Europe or to the Transvaal.

All essentials and necessities for proper harvesting and marketing should be thought about at once and also got into readiness.

The Government having again arranged for the Departmental export of the citrus crop, these notes are more particularly addressed to those who intend shipping their fruit through the Agency, but whether the grower intends to export through the Government or privately the observation of the principles laid down apply equally, and it will be simple folly to neglect them.

It is to be borne in mind that the decay of citrus fruits in transit, either to the Transvaal or to Europe, is due to the blue mould fungus, *Penicillium digitatum*, and I want growers to at once convince themselves that this fungus can only grow upon injured fruit, and that the injuries are due to carelessness in harvesting and handling the crop. It is useless attributing the trouble to climatic and other unaccountable influences, and until it is recognised that the loss arises from carelessness, or in other words unnecessary and preventable injuries to the rind in picking and handling, the loss will never be overcome.

The degree of loss directly traceable to faulty manipulation may be set down at from twenty to fifty per cent. of the fruit handled, and by far the greater part of the mischief is done in picking. The actual picking of the fruit and its treatment immediately subsequent thereto demands and must receive more personal and constant supervision from the grower himself. It must not be left largely to chance as is the case when done by inexperienced hands and by native and coolie servants.

A year ago I made certain recommendations for the handling of fruit intended for export, and stipulated that certain conditions should be complied with so far as such shipped through the Government Agency was concerned. It is a fact that growers generally failed to give full effect to those recommendations, and as a consequence lost largely through the decay of fruit in transit. This is no question of, "if a thing is worth doing, it is worth doing well," but it is an imperative duty of the grower to do things as well as they have to be done. I have said it before and I say it again, that a citrus grower who is not prepared to do his full duty to himself, who is not prepared to conscientiously undertake the "trouble" good, thorough work involves, then that grower should not make use of the Government Agency to export his produce.

Blue mould unfortunately exists in sufficient abundance in most of our orchards to insure the infection of all injured fruits. This, of course, is no unusual state of affairs because the same applies to all citrus regions of the world, and the Natal grower must not imagine that he is faced with any greater problem than the citrus grower of other parts of South Africa, of Australia, of North America and elsewhere.

A lot can be done to limit the prevalence of the mould by removing and firing all mouldy fruit. Fruit stung by fruit fly or attacked by grub or injured by thorns or dead twigs goes mouldy on the trees—such fruit should be collected and all fallen fruit should be gathered and destroyed.

None of the citrus fruits suffer more from mouldiness than the common rough lemon, and trees of this fruit form a propagating bed for the fungus throughout the year. The rind of this lemon is very readily bruised and is peculiarly subject to those punctures and injuries owing to the untrained nature of the trees. The crops of fruit are large and practically continuous; commercially the fruit is of little value and as a consequence ninety per cent. of the crop is left unharvested; in fact, rots with blue mould under the trees. No good orange or naartje grower should tolerate the presence of rough lemons in his orchard, and he will have no more trees of this useless and mischievous fruit about the place than is absolutely necessary for domestic purposes. I am glad to say that within the past twelve months I have been instrumental in getting many growers to cut out and destroy the rough lemons about their places, and I trust it will not be long before many more follow this excellent example.

The first essential to successful picking are good clippers and a supply of such should at once be obtained, not one or two but half-a-dozen or more. These clippers are generally known as orange clippers, and a very good line is stocked by Messrs. Henwood, Son, Soutter & Co., Durban. Others may be obtainable, but of these I have not heard. The blades should be slightly curved and blunt nosed. On no account should pointed clippers or pruning secateurs be used.

Ladders, picking bags and field boxes should be provided for the

work and a proper well-ventilated, but not wind-swept, packing house erected. Old packing houses should be overhauled, cleaned out and generally got into readiness.

I cannot lay too much stress upon the desirability of using proper picking bags. That is an open-mouthed bag no deeper than a fruit can be placed upon the bottom without its being dropped (say 15 inches), and one which can be slung about the shoulders of the picker. The bag should have a flap bottom so that it can be opened from beneath. This is secured by making the inner side 8 to 10 inches longer than the outer and folding it upwards upon the outer side, there securing it by straps or hooks. In a few words, cut out the bottom from a school boy's satchel, reverse the straps, and a model of a good picking bag is at once produced, all that is required being a light framework to keep the mouth open. Picking bags of this pattern can be easily enough made at home. A light iron framework for keeping open the mouth—say 15 inches by 8 inches—can be easily obtained or even made by the farmer at his own forge. The material should be strong, preferably canvas or American duck, and strong hooks and rings can be readily obtained for closing the flap.

Handle the fruit all through as you handle eggs. Some of our naartjes fetched 5s. a dozen wholesale last year in London whilst eggs exported to the same market were bringing a shilling a dozen. How few growers realise that the delicacy of touch and care of handling that experience has so quickly and rudely taught them are necessary for handling one commodity are equally essential in handling naartjes and oranges!

In picking, the fruit should be taken in one hand and the stalk severed by the clipper in the other. Never on any account sever the fruit and allow it to drop into the bag. This is a wicked practice because the falling fruit injures itself and the fruit it falls upon, and makes both subject to decay setting in within four to ten days. In cutting, the entire stalk should be removed close up to the little green, star-shaped calyx. Very often it is difficult to do this with one cut, and so it is best to cut the stalk about one inch from the fruit and then remove it entirely by a second cut. Care must always be taken not to injure the rind with the finger nails (see that your coolies and kafirs have theirs trimmed close), nor with the nose of the clippers, also be careful not to shear off little bits of skin with the blades during the process. When cut the fruit is gently placed in the picking bags and never on any account dropped or tumbled in. Do not mind if your man is slow so long as he is careful—too much haste spells too much waste. Insist upon the careful removal of the stalk. Nothing is so likely to bruise, puncture, scratch and generally injure fruit from the moment it is placed in the picking bag until the grading, sizing and packing is completed than a projecting

stalk. Throughout the process one stalk is sufficient to injure dozens of fruit.

When the picking bag is full it should be carried to the field box, but on no account must the fruit be "poured" from bag to box. No one would think of pouring eggs from a basket into a box, and, equally, no one should think of doing so with naartjes and oranges. The full bag is placed gently on the bottom of the field box, the flap is then released and *the bag drawn away from the fruit.*

The field boxes should be smooth planed inside so as to avoid splinters and sharp edges should be rounded off.

They should have the ends about an inch and a half higher than the sides so that when stacked one on another in the curing shed the air may circulate amongst the fruit. There should also be half inch spaces between the sides and bottoms and the boards forming the bottom might also be half-inch apart. The boxes should not be too deep, and I suggest this form so that the fruit can be cured without further handling.

Curing is both desirable and necessary. Fruit that has been injured before picking and during picking will show up in the course of five or six days' curing, and it is far better for this loss to take place in the orchard than whilst the fruit is in transit. There is no particular risk in curing, and if fruit is sound it will keep sound for weeks without any cooling whatever. Fruit intended for export should not be handled and sent forward to the central packing house until it is fully cured. If five days' curing is asked for it must be five full days and not calculated as from the day of picking up to the day of the arrival of the fruit at the Point. There was far too many of these calculations, with equally many unhappy results for such practices to be again tolerated last year.

Many growers think that cool storage prevents the growth of mould, but this is not by any means the case. Blue mould grows just as readily in the cool chamber as it does out of it, and it can only be prevented by careful attention to the picking and handling of the fruit whilst the rind is brittle and full of moisture.

It is not yet too late to spray and fumigate citrus trees for scale-insects, especially in the districts where crops ripen late. It is, I fear, too late to begin Bordeaux spraying to control Black Spot and Melanose; this is work which to be at all successful must be undertaken before the New Year. Whilst upon the subject it is well to point out that some danger is to be anticipated from fumigating trees recently sprayed with Bordeaux mixture. As a general rule, however, citrus trees can be fumigated without any risk from the time the fruit is half grown until and when the trees are in blossom; it is dangerous to fumigate trees bearing young fruit, as the treatment is apt to bring down large quanti-

ties. Further, it is, of course, undesirable to fumigate trees when wet with rain or heavy dew.

GENERAL.

Clean up and plough the orchard lands so that as much moisture as possible may be preserved in the soil during the long, dry winter.

Give attention to all permanent improvements such as fencing and draining. Clean out old drains and put them in order.

If any orchard extension is contemplated next spring do not delay breaking up new land any longer, so that it may have as much bare fallow as practicable.

Give the attention recommended in last month's notes to the control of peach aphid, woolly aphid, fruit fly and orange moth—and look out for and destroy bot fly eggs which will be deposited on the farm horses. Every egg destroyed means a maggot the less in the animal's stomach. Indeed one treatment may mean 100 or more bots the less, and it does not entail much trouble.

Irrigate or water citrus trees lightly if they require it.

The ties of all fall buds which have been put in will require attention and loosening.

All dead or moribund trees should be now dug out and the holes left open throughout the winter so that the land may sweeten, and before replanting in the spring put a cartload of fresh soil into these holes.

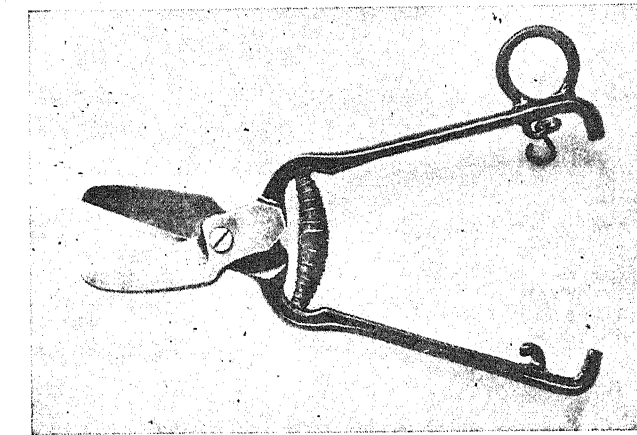
A Model Packing House.

Since writing the "Orchard Notes" for April, my attention has been drawn to the following comments upon a Californian project which helps to give point to the recommendations made therein:—

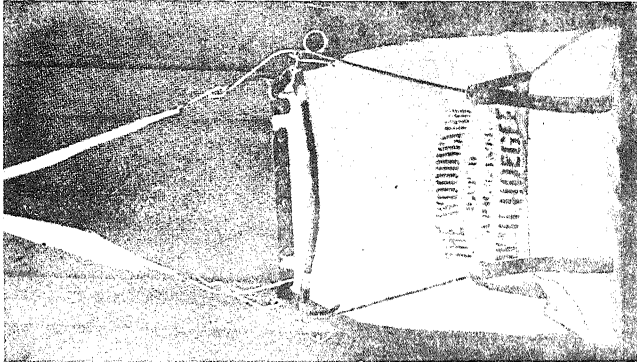
At Pachappa Station, which may be said to be the soul and centre of the orange-growing district of Riverside, there is nearing completion a packing house whose operations will be watched with the keenest interest, not only by those engaged in the orange business, as growers and shippers, but by the Department of Agriculture at Washington as well, says the *Riverside Press*.

Mr. C. E. Rumsey, owner of the Alta Cresta groves, is having the house built, and it will be the pioneer in all that pertains to the handling of oranges in a scientific and painstaking manner. The fruit, in the vicissitudes that attend it from the orchard to the packed box and to the car that carries it to the markets of the East, will be subjected to a scrutiny and to requirements that have never been attempted heretofore.

This will be made possible because Mr. Rumsey's own fruit will go through his own packing house. It will be effective because the men entrusted with the handling of the fruit will be expected to have a pride in the work that will be attempted. Whether they do or not will be determined by a system of checking.



A fairly good pair of Orange Clippers.
Note the curved blades. If anything
the blades are a little too pointed.



An American Orange Picking Bag.
One of simpler construction but on
the same principle could be made
on the farm.

In view of the important results secured through the investigations of the Department by G. Harold Powell in the matter of decay due to faulty handling from the grove to the car, precautions will be taken by Mr. Rumsey in the handling of his fruit that do not seem to be necessary. However, it is the intention thoroughly to exploit the virtue there may be in the careful handling of fruit in all its stages, and no expense will be spared this first season in order that definite conclusions may be reached.

Every picker will be required to cut the stems twice and to wear gloves on the left hand. He must fill his own box and put his ticket in it, so that if the inspection at the house reveals any injuries the blame may be properly placed.

Before being taken to the packing house the fruit will be allowed to remain in the orchard over night, in order that it may get the benefit of the reduced temperature the cool night air will give it.

The roads leading to the packing house have been carefully graded and the wagons provided with platform springs so as to avoid all possible jarring. The wagons are of special construction, being built low down. The box will be carried up an inclined plane and placed on the wagons without rehandling.

At the packing house the boxes will be picked up six at a time on rubber-wheeled trucks and carefully placed on the floor. An automatic dumper will then take the filled boxes, gently turn them over sideways and roll the fruit on to a canvas-covered hopper stuffed with horsehair. After being carried horizontally to the grading table, without elevator or dump, the fruit will be carefully inspected and assigned to its proper grade. Passing to the canvas bins, another precaution is provided. The bins are automatically weighted to prevent the fruit from dropping too far, and, like the picker, the packer will be required to have the left hand gloved.

An order has been placed for a gravity conveyor, a feature that has not yet been adopted by the houses in this section of the country. Aside from its convenience and economy, it would seem to be in line also with Mr. Rumsey's idea of sparing the fruit all possible jar in handling. By this method the fruit will leave the packer on an inclined plane to the presser and the nailer. The latter workman will then place the box so that it may continue on its way to the car and to either end of the car, where other workmen store the fruit without the necessity of carrying it any great distance.

Mr. Rumsey presents the matter in a nutshell when he states that no expense will be spared to pick, store, pack and load his fruit in the most careful manner, the belief being that the keeping qualities thus obtained will save the buyer from loss, so far as it is possible to do outside of the risks of travel to which the fruit is subjected by the railroads.

Crown Forests.

AFFORESTATION IN FEBRUARY.

THE Chief Afforestation Officer (Mr. F. J. Staynes) reports as follows to the Director of the Division of Agriculture and Forestry for the month of February:—

February, like the preceding month, has been a favourable one from a forester's point of view, and all trees have shown their appreciation by excellent increment. The maximum temperature registered during the month was 86, the minimum 50, the means being 73 and 55 respectively. The hours of sunshine having been very few, the new growth the trees have made is distinctly sappy, and should early frosts occur will be liable to considerable injury. Should we experience reasonable dry April and May months, however, the wood will harden off and a record increment be made.

For the past year I have been collecting indigenous specimens and acquiring exotics by exchange for the small Aboretum which for the time being has to take the place of the larger one planned before Natal's lean years set in. It is now planted and practically complete, and I append hereto a list showing the species included. From it you will see that no less than forty-nine natural orders are represented. This should be of considerable help to the science master for botanical demonstrations to the students. At present the mealies sown between the rows of trees prevent many of the species from being seen, but after the removal of the catch crop the whole will be put under lawn, and against the various trees and shrubs labels will be placed showing their botanical and vernacular names, together with their habitat and economic uses, if any.

ANACARDIACEÆ	...	<i>Rhus coriaria</i>	...	...	South America.
	...	<i>Rhus lacrigata</i>	...	...	Natal.
	...	<i>Rhus sp.</i>	...	...
	...	<i>Schinus molle</i>	...	...	Peru.
	...	<i>Schinus terebinthifolius</i>	...	...	Brazil.
APOCYNACEÆ	...	<i>Nerium oleander</i>	...	...	South Europe.
	...	<i>Thevetia nerifolia</i>	...	...	Brazil.
ARALIACEÆ	...	<i>Aralia sieboldii</i>	...	...	Japan.
BERBERIDEÆ	...	<i>Berberis vulgaris</i>	...	...	Britain.
BETULACEÆ	...	<i>Betula alnoides</i>	...	...
BIGNONIACEÆ	...	<i>Jacaranda mimosæfolia</i>	...	...	Brazil.
	...	<i>Tecoma smithii</i>	...	...	Garden Hybrid.
BIXINEÆ	...	<i>Aberia caffra</i>	...	...	South Africa.
	...	<i>Kiggelaria dregeana</i>	...	...	"

CAPRIFOLIACEÆ	...	<i>Abelia floribunda</i>	...	Mexico.
		<i>Diervilla (Weigela) rosea</i>		China.
		<i>Sambucus nigra</i>	...	Britain
		" "		<i>var variegata</i>
CASUARINÆ	...	<i>Casuarina quadrivalvis</i>	...	Australia.
		" <i>tenuissima</i>	...	"
		" <i>torulosa</i>	...	"
CISTINÆ	...	<i>Cistus ladaniferus</i>	...	Spain.
COMPOSITÆ	...	<i>Montanoa bipinnatifida</i>	...	Mexico.
CONIFERÆ	..	<i>Araucaria Bidwilli</i>	...	Australia.
		" <i>braziliensis</i>	...	Brazil.
		" <i>Cookii</i>	...	New Caledonia.
		" <i>cunninghamii</i>		Australia.
		<i>Callitris calearata</i>	...	"
		" <i>rhomboidea (australis)</i>	...	"
		<i>Cedrus deodara</i>	...	Himalayas.
		" <i>libani</i>	...	Asia.
		<i>Cryptomeria japonica</i>	...	Japan.
		<i>Cupressus arizonica</i>	...	Arizona.
		" <i>funnebris</i>	...	China.
		" <i>goeniana</i>	...	California.
		" <i>lawsoniana</i>	...	"
		" <i>sempervirens var pyramidalis</i>		
		" <i>sempervirens var horizontalis</i>		
		<i>Dammara australis</i>	...	New Zealand.
		<i>Pinus excelsa</i>	...	Himalayas.
		" <i>canariensis</i>	...	Canary Island.
		" <i>longifolia</i>	...	Himalayas.
		" <i>massoniana</i>	...	Japan.
		" <i>pinaster</i>	...	South Europe.
		" <i>sabineana</i>	...	California.
		<i>Podocarpus chinensis</i>	...	China.
		" <i>Thunbergii</i>	...	South Africa.
		<i>Sequoia sempervirens</i>	...	California.
		<i>Taxodium distichum</i>	...	North America.
		<i>Thuya gigantea</i>	...	California.
		" <i>orientalis</i>	...	Japan.
		<i>Tsuga canadensis</i>	...	North America.
CORNACEÆ	...	<i>Aucuba japonica</i>	...	Japan.
		<i>Cornus species</i>	...	"
		<i>Curtisia faginea</i>	...	South America.

CUPULIFERÆ	... <i>Castanea sativa (vesco)</i> ...	South Europe,
	... <i>Quercus rubra</i> ...	North America.
	... „ <i>suber</i> ...	Spain.
CYCADACEÆ	... <i>Cycas revoluta</i> ...	China.
ERICACEÆ	... <i>Azalea indica</i> ...	„
	... <i>Rhododendron ponticum</i> ...	Asia Minor.
EUPHORBACEÆ	... <i>Buxus sempervirens</i> ...	Britain.
	... <i>Sapium sebiferum</i> ...	Tropics.
GRAMINEÆ	... <i>Bambusa fortunei var niveo-</i> ... <i>vittatus</i> ...	North China.
HAMAMELIDEE	... <i>Liquidambar styraciflua</i> ...	North America
ILICINÆ	... <i>Ilex peruviana</i> ...	Peru.
JUGLANDEÆ	... <i>Juglans nigra</i> ...	North America.
LAURACEÆ	... <i>Laurus camphora</i> ...	Japan.
	... „ <i>nobilis</i> ...	South Europe.
LEGUMINOSÆ	... <i>Acacia baileyana</i> ...	Australia.
	... „ <i>pravissima</i> ...	„
	... „ <i>pycnantha</i> ...	„
	... „ <i>riceana</i> ...	Tasmania
	... „ <i>spectabilis</i> ...	Australia.
	... <i>Calpurnia lasiogyne</i> ...	Natal.
	... <i>Castanospermum australe</i> ...	Australia.
	... <i>Dalbergia sissoo</i> ...	India.
	... <i>Erythrina latissima</i> ...	Natal.
	... <i>Gleditschia triacanthos</i> ...	North America.
	... <i>Laspedezia sieboldii</i> ...	Japan.
	... <i>Robinia pseudacacia</i> ...	North America.
	... <i>Sophora glauca</i> ...	Nepaul.
	... „ <i>japonica</i> ...	Japan.
	... <i>Spartium junceum</i> ...	Spain.
LILIACEÆ	... <i>Phormium tenax</i> ...	New Zealand.
	... <i>Yucca aloifolia</i> ...	South America.
LYTHRARIÆ	... <i>Punica granatum</i> ...	South Europe.
MAGNOLIACEÆ	... <i>Liriodendron tulipifera</i> ...	North America.
	... <i>Magnolia fuscata</i> ...	China.
	... „ <i>grandiflora</i> ...	North America.
MAIVACEÆ	... <i>Hibiscus chinensis</i> ...	East Indies.
	... „ <i>rosa-sinensis</i> ...	„
	... „ <i>schizopetalus</i> ...	„
	... <i>Lagunaria pattersonii</i> ...	Norfolk Island.
MELIACEÆ	... <i>Khaya senegalensis</i> ...	Tropical Africa.
MYRTACEÆ	... <i>Callistemon (metrosideros)</i> ... <i>lanceolatus</i> ...	Australia.
	... <i>Eugenia eucalyptoides</i> ...	„

MYRTACEÆ	... <i>Eugenia jambos</i> ...	India.
	<i>Leptospermum laevigatum</i>	Australia.
	<i>Melaluca ericifolia</i> ...	New South Wales.
	„ <i>hypericifolia</i> ...	„
	„ <i>leucadendron</i> ...	East Indies.
	<i>Myrtus communis</i> ...	South Europe.
	<i>Tristania conferta</i> ...	Australia.
NYCTAGINEÆ	... <i>Bougainvillea glabra</i> ...	Brazil.
	„ <i>var sanderiana</i> „	
	„ <i>spectabilis</i> ...	„
OLEACEÆ	... <i>Fraxinus ornus</i> ...	South Europe.
	<i>Jasminum pubigerum</i> ...	India.
	<i>Ligustrum japonicum</i> ...	Japan.
	„ <i>var aureo-variegata</i> „	
	<i>Syringa vulgaris</i> ..	Persia.
ONAGRARIÆ	... <i>Fuchsia, garden hybrid.</i>	
PALMEÆ	... <i>Phoenix sp.</i>	
	<i>Rhapis flabelliformis</i> ...	China.
PITTOSPOREÆ	.. <i>Hymenosporum flavum</i> ...	Australia.
	<i>Pittosporum tobira</i> ...	Japan.
	„ <i>undulatum</i> ...	New South Wales.
PLATANACEÆ	... <i>Platanus occidentalis</i> ...	North America.
PROTEACEÆ	... <i>Grevillea robusta</i> ...	Australia.
	<i>Macadamia ternifolia</i> ...	„
ROSACEÆ	... <i>Crataegus oxyacantha</i> ...	Britain.
	<i>Cotoneaster pyracantha</i>	
	<i>Pygeum africanum</i> ...	Natal & Trop. Africa.
	<i>Raphiolepis indica obovata</i>	China.
RUBIACEÆ	... <i>Bouvardia, garden hybrid.</i>	
	<i>Gardenia jasminoides</i> ...	„
	„ <i>var florida</i> „	
	„ <i>var fortunei</i> „	
SAPPINDACEÆ	... <i>Acer platanoides</i> ...	Europe.
	„ <i>pseudoplatanus</i> ...	Britain.
	<i>Dodonaea viscosa</i> ...	Tropics.
	<i>Greyia sutherlandii</i> ...	Natal.
SAXIFRAGEÆ	... <i>Hydrangea hortensis</i> ...	China.
	„ <i>paniculata</i> ...	Japan.
	<i>Philadelphus coronarius</i> ...	South Europe.
SCROPHULARINEÆ	<i>Brunfelsia calycina</i> ...	Brazil.
	„ <i>eximia</i> ...	„
	„ <i>uniflora</i> ...	„
	<i>Paulonia imperialis</i> ...	Japan.
	<i>Veronica sp.</i>	

SIMARUBEÆ	... <i>Ailanthus glandulosa</i>	... China.
SOLONACEÆ	... <i>Cestrum</i> (<i>habrothamus</i>)	
	<i>elegans</i> ...	... Mexico.
STERCULIACEÆ	... <i>Brachychiton acerifolia</i>	... Australia.
	<i>Dombeya punctata</i>	... Bourbon.
	" <i>spectabilis</i>	... Tropieal Africa.
	<i>Sterculia diversifolia</i>	... Australia.
	" <i>platanifolia</i>	... China.
TERNSTROMIACEÆ	<i>Camellia japonica</i>	... "
THYMELIACEÆ	... <i>Dias cotonifolia</i> ...	... South Africa.
	<i>Daphne indica</i> ...	... Japan.
URTICACEÆ	... <i>Celtis australis</i> .	... South Europe.
	<i>Maclura aurantiaca</i>	... North America.
	<i>Morus serrata</i> ...	... India.
	<i>Ulmus parvifolia</i>	... Japan.
VERBENACEÆ	... <i>Duranta plumieri</i>	... West Indies.
	<i>Petrea volubilis</i> ...	... Vera Cruz.

Revenue realised during February from Cedara Nursery has been £33 19s. 10d., as against £19 10s. 3d. the same month in 1908. Planting done during the month has not been very considerable, the preparation of ground for wattles and cleaning of plantations laid down last year having occupied available labour. To 4,700 *C. lusitanica* reported as put in previously this season 675 should now be added. This completes the area (slightly over three acres) intended for Cedar of Goa. The filling of the gap between the Home Arboretum and the *E. amygdalina* plantation is now finished, 500 *E. sieberiana*, 800 *E. virgata* and 3,022 *E. resinifera* being employed for the purpose. This brings the total number of Eucalyptus species represented by plantations on the Central Experimental Farm to 32, exclusive of two species—i.e., *E. ficifolia* (Red Flowering Gum) and *E. marginata* (Jarrah), which is dying out. In connection with the latter species, I frequently have to warn the public against it, as its success is highly problematical in Natal. Excellent substitutes are *E. paniculata* (Torr Vale Gum for the coast and warm midlands and *E. sideroxylon* (Iron Bark) for the uplands.

CONSERVATION IN FEBRUARY.

The Chief Forest Officer (Mr. G. H. Davies) reports as follows to the Director of the Division of Agriculture and Forestry:—

Foresters' returns have reached me later in date, owing partly to the shortness of February in the calendar, but chiefly to the isolation caused by swollen rivers. In New Zealand, which cannot afford handsome bridges, they have a way, I hear, of stretching wire ropes across

streams to obviate such checks to business. This might do here in places, but hardly at Maputa, from which Forester Gryspeerd on the 27th February reports the first through post for six weeks. He describes his country as being mostly under water: a series of lakes stretching for miles. A boat of some kind—say, a light flat-bottomed canoe—seems to be indicated, *pace* “hippos” and “crocs.” Several fatalities have resulted from the floods, and I was very sorry to hear of the loss of Mr. C. J. Fullwood, of the Natal Police, in the Bushman’s River, which is confirmed by Forester Symons. Mr. Fullwood kindly accompanied me last winter across the same river, when he told me how dangerous it was when up. On the coast the rain has been more moderate, and the floods the result of up-country deluges upon mountains clear of forest trees and humus: the former regulating the rainfall by spreading it over the year, the latter storing the waters and yielding them gradually. At Empangeni Forester Clark reports the unpleasant predicament of planters with land on both sides of the Umhlathuzi and never a bridge between. Writing on 26th February, he gives 5.42 inches of rain for month to date, while Forester Symons, of Giant’s Castle in the Berg, on the same date gives 10.73 inches of rainfall—more than double. Let us be thorough: scrape our uplands clear of grass even, and so concentrate our rainy season into a week’s deluge shed instantly by bare rock into the sea.

The hippopotamus, sacred in Zululand hitherto, seems likely to attract to himself a dangerous notoriety now that the Province is in course of settlement. As an ancient lord of the soil, he could with impunity destroy the crops of the natives, and Forester Gryspeerd so reports of him last month; but Forester Clark now accuses him of disporting his unwieldiness in the cane fields of the white man, and there will be trouble. There may even be a relaxation of those game laws of Zululand which make the very thought of shooting a “hippo” high treason to all residents. Other pests reported on include locusts, of which a small swarm of fliers passed over Empangeni on 26th February, and of which Forester Garland destroyed six swarms of hoppers at Springvale, near Ixopo, during the month with a spray of arsenite of soda and sugar supplied by the Government Entomologist. Forester Garland describes the effect of the Government formula as deadly to the plague in the hopper stage. Wild pig are a nuisance at Ngomi, and made free with Forester Fosters’ whole crop of sweet potato during his absence. Monkeys are complained of by Forester Vanderwagen at Entumeni.

With regard to game, the eland at Giant’s Castle are still in large herds. Forester Symons found a Vaal rhebok doe lying dead at the salt-lick—probably kicked on the head by an eland. At Normandien Forester Moller found partridges killed by the weather, and reports

the loss, by one farmer, of a hundred sheep from the same cause. Crops up-country have been ruined by saturation, but along the coast promise so well that Forester Green, of Ngoya, reports "lots of corn this year, lots of beer, lots of fighting, lots of work for the Magistrate, lots of money for Government." I like optimism.

Forester Houshold reports the Black Ironwood in seed at Qudeni. Riding along a footpath above this grand forest one year in the last century, I noted that all the ironwood trees had been stripped bare by locusts, and in that year not a single ironwood seed was to be had. When locusts attack a forest ironwood is certain to suffer the loss of every leaf, and its near relative, the European Olive, is, I believe, equally open to such depredations. Forester Garland has sent you about a pound of Red Ivorywood seed, and more forest trees are now fruit-forming. Late flowerers noted by Forester Chilvers include Assegai, Faurea, Wild Chestnut, Gardenia, Black Stinkwood, *Dais cotinifolia*, *Schmidelia* and White Pear.

The wattle plantations having been thinned to the extent of five acres each experimentally, the papers will be shortly returned to you. On a portion of the Ingeli Plantation, Forester Chilvers reports wattles under three inches in diameter and forty-two feet long. They are the result of close sowing on the site of an old cattle kraal. Forester Eyles, from Imbizana, beyond Port Shepstone, states that wattle wood is being increasingly used for the construction of farm buildings in his district. This is really to the advantage of indigenous forest, to which the heavy cuttings of poles have always been more harmful than the felling of mature trees. Mr. Eyles having reported enquiries for timber, a marking-hammer has been supplied to him, but I suspect that the East Coast plague—now in evidence south of the Umkomaas—will interfere with all such projects. At Ixopo all ox transport has been stopped entirely. At Riverside Forester Fernando complains of the local interpretation of the Cape Colony prohibition of the entry of forest produce into East Griqualand as including transplants of seedlings raised in the Emkazeni nursery, though such from other nurseries are allowed. The effect is that he cannot send plants to customers' orders to the Riverside Railway Station—just across the Ingwangwane—but is obliged to send them to Creighton without the convenience of transport existing before the extension of the line. As this interpretation is unnecessary and vexatious, I hope that you will make it the subject of enquiry.

Wattles at Pongola, near Luneberg, are reported by Forester Meyer to have been much damaged by water where recently sown, temporary springs appearing all over the ground. You will have noted from the revenue returns that a little timber-working is fitfully proceeding still; but until either the restrictions imposed by reason of the cattle pest

are removed, or other means of transport put in practice, no great revival in bush-working can be expected. Now is the time for mechanical traction, "caterpillar" motors and the like. A traction engine has been put upon the road at Ixopo, and it stays there contentedly enough. Its only resemblance to a caterpillar is its habit of curling itself up to take a nap.

Forester Foster, at Ngomi, has been improving the approach to the Forest Lodge, and, as I could not see how anything on wheels could get there, something had to be done. The question of the upper road to Impetyene Forest in Alfred County must stand over, I suppose, until the revival of the timber-working there warrants the expenditure pronounced to be necessary by Mr. Widdicombe.

Forester Gryspeerd, of Maputa, reports that the rubber vines "are looking splendid and fully ripened up." He states that the European responsible for bush destruction—of whom he complained—has left his district. Contraventions generally have not been numerous lately, and the cheapened rate for dry firewood is being more taken advantage of. The still cheaper annual charge does not, however, seem to be popular with the natives, to whom a sum of five shillings down is probably too large a venture. Labour agents for the Transvaal mines are doing fair business here, and, with the money earned, the natives must become more prosperous shortly and better customers to the foresters.

No matter how modern the machine, its success depends upon the man who uses it.

The lighting of every portion of the interior of the creamery should be sufficient in order that the presence of dirt, whether on the walls or floor, or on the tanks, machines or other appliances, may be easily observed by the staff.

Under the provisions of Section 5 of Act No. 22, 1906, the boundaries of the Magisterial Division of Lion's River have been altered so as to exclude the farm known as Remainder of Steil Kop of Tweefontein, and the boundaries of the Magisterial Division of Umvoti have been altered so as to include that farm.

Pineapple Export.

RESULT OF SEASON'S EXPERIMENTS.

THE following report has been submitted to the Minister of Agriculture by Mr. Claude Fuller:—

Four experimental shipments of Natal-grown pineapples have been forwarded to London, commencing with that of 1st January, by the R.M.S. "Norman," upon which a preliminary statement was published shortly after the consignment was despatched and concerning which several Reutergrams were given publicity to.

The following report is upon the first shipment, and refers only to the small "Natal pineapple." The latter shipments comprised a good many of the Cayenne pine—frequently miscalled the "Queen"—but in the absence of reports from the Commercial Agent, no statement can be made concerning these at present. These experiments have had for their object the acquisition of definite and reliable data for public information regarding the shipping of pineapples to so distant a market and the possibilities before the Colony of opening up an export line in these fruits. It was found necessary to ascertain how the fruit, in various stages, behaved when shipped in cool chamber or by ventilated hold, what style of packing is most desirable, what the value of the pines (according to condition) is at the further end and the general expenses and charges to be met in placing the fruit upon the London market. It will be remembered from my preliminary report that before packing the fruit was sized and graded according to the degree of colour it was in; and, further, that all was packed in the same manner, part being despatched by cool chamber and part by ventilated hold, or such equivalent as the Union Castle Company provide under this designation.

Each fruit was wrapped separately and packed in two tiers to the box with a layer of wood-wool beneath and one above, but none beneath the two tiers of fruits.

With regard to the degree of colour when packed, I may say that I erected four grades, which are referred to later as 1, full yellow; 2, pale yellow; 3, light green; 4, black green. It should be noted at once that the pine preferred by the London buyer has a reddish tinge, but in this experiment no pines of so deep a colour were sent. It will, however, be found in perusing the Commercial Agent's remarks that some of the green pines shipped by hold acquired this desired colour in transit.

The full yellow pines were just a nice even yellow colour, not pale, and without any green patches showing. The pale yellow grade consisted of pines that were either uniformly pale yellow or were pale yellow with greenish patches, or of a greenish yellow colour. The light green pines had no patches of yellow and were a uniform light green. The black green grade consisted of fruit still wanting a few days to come to maturity, as indicated by the more pointed sections (eyes), of a dark green with either black green or brown green lying in the furrows.

I may add that each box was marked and numbered, but the data concerning the contents was not communicated to the Commercial Agent.

In his summary, Mr. Harrison says:—

The outstanding points may be stated as follows:

1. The superior flavour of these pines has "caught on." It is pronounced exquisite.

2. Packing in single layers is imperative—at any rate, when the fruit is carried in hold.

3. The fruit in every box from the hold was bruised more or less, and a lot were over-ripe and mouldy.

4. On the whole the pines carried very well in the cool chamber.

5. The prices for the small pines, perfectly sound and clean, varied from 5s. to 8s.

6. The demand for these small pines, when once they can be guaranteed to arrive in good condition, will be very big.

7. Shipments should start with only about 500 cases weekly, increasing gradually up to a point when cabled advice of sales prove that any further advance would be unpayable.

8. The shipments *must be regular*.

9. The prices I anticipate will be in the vicinity of 4s. 6d. to 5s. per dozen in London. On the Continent correspondingly higher. (The Commercial Agent will have to arrange to place parcels at a minimum of 5s. if any trade is to be built up; in fact, 6s. is not too low a minimum for this fruit arriving in good condition. Those who profess to know the London market methods tell me that prices are as often as not fixed by valuers without any idea or consideration of the cost of production or the expense attached to placing the fruit in London.—C.F.)

10. The pines with stalks sealed with sealing wax looked freshest and best and weighed heavier than unsealed pines.

11. There is a marked improvement in the crowns and general even appearance of the ripe pines to those previously sent from Natal.

12. The larger number of "green" were placed in a suitable warm

room to colour, but after five days but little if any sign of colouring has taken place. Some of fruit is going soft and the crowns perishing.

With regard to the length of stalk, no comment is made upon the fruits without stalks, although it is evident that they commanded a lower price than those with stalks. I find from a few experiments I have made that pines with stalks keep in better appearance than those without. Some pines sent with 4 inch stalks are commented upon as having "the stalks too long," whilst $1\frac{1}{4}$ inch stalks are described as good," and $1\frac{1}{2}$ inch stalks as "quite long enough."

The following analysis is prepared from data made when packing and from the details contained in the Commercial Agent's report.

In the first column is given the reference mark and number used in my preliminary report; in the second the weight of the pines; in the third the number of pines to the package; in the fourth the colour when packed; in the fifth Mr. Harrison's comments; and in the last the price realised:—

COOL CHAMBER SHIPMENT:
(Temperature 35° to 38° F.).

Experi- ment Number	Weight of Fruits in Pounds	Number of Fruits to Case	Colour When Packed	Remarks by Commercial Agent	Prices realised for each Case
A 4	$1\frac{1}{2}$	12	Full Yellow	All good condition and colour ...	s. d.
B 4	$1\frac{3}{4}$	12	do.	Very good case, even colour, all sound	8 0
B 4	$1\frac{3}{4}$	12	do.	Very good case, even colour, all sound, with fine dark crowns ...	8 0
B 4	$1\frac{3}{4}$	12	do.	Very good case, one fruit bruised ...	6 0
B 7	2	12	do.	Very fine, all sound, crowns perfect. This pine would have a very big sale; a splendid looking fruit ...	6 0
B 1	$1\frac{1}{2}$	12	do.	All good colour, one over-ripe ...	6 0
B 1	$1\frac{1}{2}$	12	do.	Good condition, one bruised ...	6 0
B 1	$1\frac{1}{2}$	12	do.	Good condition throughout, colour little lighter ...	6 0
C 3	$1\frac{3}{4}$	12	do.	An excellent case. Crowns very good. A clean attractive pine. Will go well here ...	8 0
C 1	$1\frac{1}{2}$	12	do.	All good colour and condition ...	6 0
C 1	$1\frac{1}{2}$	12	do.	Even colour, condition excellent. Might be redder ...	6 0
C 1	$1\frac{1}{4}$	12	do.	Even colour, condition excellent. Might be redder ...	6 0
C 2	$1\frac{1}{4}$	12	do.	Fairly even colour, all sound, good crowns ...	4 0

It is to be noted from the Commercial Agent's remarks that the $1\frac{1}{4}$ lb. and 2 lb. pines found the greatest favour, and that the small $1\frac{1}{4}$ lb. pines fetched a proportionately low price. Further, these full yellow pines carried very well and opened up in practically the same condition and colour as that in which they were packed. The wastage appears to have amounted to only two in 131 pines.

Experiment Number	Weight of Fruits in Pounds	Number of Fruits to Case	Colour When Packed	Remarks by Commercial Agent	Prices realised for each Case
A 5	1½	12	Pale Yellow	All sound, crowns good, colour even but dull ...	s. d. 6 0
A 5	1½	12	do.	All sound, colour good, eyes a bit dark ...	4 0
A 5	1½	12	do.	All sound, lacking colour and dirty ...	4 0
A 6	1½	12	do.	All sound, colour even, firm crowns and stalks not shrunken ...	6 0
A 6	1½	12	Stalks Seal'd do.	All sound, colour even, but rather light ...	6 0
B 8	2	9	Pale Yellow	All sound, very nice appearance, colour light ...	6 0
B 2	1½	12	do.	Excellent pine, sound, clean eyes, two greenish ...	5 0
B 2	1½	12	do.	Good conditioned pines, two or three unevenly coloured ...	5 0
B 2	1½	12	do.	Good conditioned pines, pale and unevenly coloured ...	5 0
B 5	1½	12	do.	Very good colour and crowns, good condition ...	5 0
B 5	1½	12	do.	Two green, rest well coloured, good condition ...	3 6
B 5	1½	12	do.	Three quite green, one rotten, colour uneven and pale ...	3 6
B 2	1½	12	do.	Rather small (? crowns), pale, good condition ...	3 6
B 2	1½	12	do.	Two or three bleeding a little ...	3 6
B 2	1½	12	do.	Greenish, bruised; otherwise in good condition ...	3 6
B 2	1½	12	do.	All good colour, light ...	3 6
B 2	1½	12	do.	Colour light, four bruised ...	3 6
B 2	1½	12	do.	Not evenly coloured, one over-ripe ...	3 6
C 4	1½	12	do.	Very good condition and colour ...	4 0
C 4	1½	12	do.	Sound, yellow little green in places ...	4 0
C 4	1½	12	do.	Good, four a little green others well coloured ...	4 0
C 5	1½	12	do.	Some ripe some not, good crowns ...	4 0
C 5	1½	12	do.	Sound, colouring light ...	3 6
C 5	1½	12	do.	Condition good green but turning yellow ...	3 6
C 5	1½	12	do.	Condition good, colour not quite developed ...	3 6
C 5	1½	12	do.	Condition good, patches of green ...	3 6

It is seen that the pines carried very well. Three cases were found to contain bruised or bleeding fruit, and this is attributed "at the other end" to too tight packing, but from the fact that they belong to a lot which were previously noted as having been somewhat roughly handled when sent forward to the Packing House, the result indicates, to my mind, how well the fruit was preserved in cool storage. As in the case of the full yellow pines, these opened up practically in the same colour as they presented when packed. From the remarks and prices, some of the pines improved in colour a trifle after packing, and, as this occurs amongst the first lot of pines packed, I think the improvement occurred before the pines went into the cool chamber.

Experiment Number	Weight of Fruit in Pounds	Number of Fruits to Case	Colour when Packed	Remarks by Commercial Agent	Prices realised for each Case
A 11	1½	12	Mixed, 9 full yellow, 3 pale yellow, stalkless.	Quite sound, colour good, eyes a little dirty, stalkless ...	s. d. 4 0

It is concluded that the absence of stalks brought down the price of this box of pines. As a general result of the experiment, 1¼ inch stalk is what is required. This length is spoken of as "good" and 1½ inch mentioned as "quite long enough."

Experiment Number	Weight of Fruit in Pounds	Number of Fruits to Case	Colour when Packed	Remarks by Commercial Agent	Prices realised for each Case
A 7	1½	12	Light Green	All sound, not well coloured, 2 or 3 green ...	s. d. 3 6
A 7	1½	12	Do.	All sound, light colour, several green	3 6
A 8	1½	12	Do.	Sealed stalks, all sound, on green side	3 6
D	1½	12	Do.	All good but green, 4 just turning colour ...	5 0
D	1½	12	Do.	3 ripe, 3 changing colour, sound, crowns good ...	5 0
E	1½	12	Do.	All good, appearance good, half turning yellow ...	5 0

It is quite inexplicable why three of these cases brought 5s. each, and it may be some error. The three ripe pines were so when packed, having been put in to make up the case. Taken upon the whole, there was a slight change in the colour, but this, I have little doubt, occurred before the pines went into the cool chamber or came under the influence of its temperature.

Experiment Number	Weight of Fruit in Pounds	Number of Fruits to Case	Colour when Packed	Remarks by Commercial Agent	Prices realised for each Case
A 9	1½	12	Black green	All sound, but green ...	s. d. 2 6
A 9	1½	12	Do.	Do. do. ...	2 6
A 9	1½	12	Do.	Do. do. a few just turning	3 0
B 3	1½	12	Do.	Quite green, but good condition ...	2 6
B 3	1½	12	Do.	All on green side, 6 slightly turning ...	3 6
B 3	1½	12	Do.	All on green side, 3 slightly turning ...	3 6
B 3	1½	12	Do.	All on green side, some slightly turning	3 6
C 6	1½	12	Do.	Condition good, greenish, turning yellow ...	3 0

Experiment Number	Weight of Fruits in Pounds	Number of Fruits to Case	Colour When Packed	Remarks by Commercial Agent	Prices realised for each Case
F	1 ¹ / ₂	12	Black green	Greenish, 3 bruised, 3 turning ...	s. d. 3 0
G	1 ¹ / ₂	12	Do.	Perfectly sound, good stalks and crowns, 9 green, 3 turning ...	4 0
G	1 ¹ / ₂	12	Do.	Perfectly sound, good stalks and crowns, 6 green, 6 turning ...	4 0
H	1 ¹ / ₂	8	Do.	All green, good, good firm crowns ...	4 0
H	1 ¹ / ₂	8	Do.	All green, good, just turning ...	4 0

There has been an undoubted improvement in the colour of these pines; but, from other observation made, I am sure it took place before the fruit came under the influence of the low temperature, and so no improvement in colour occurred in transit. The prices realised, whilst unprofitable, are satisfactory considering the fruit opened up so green.

The most noticeable feature of the cool chamber shipment is the satisfactory manner in which the pines travelled, the one per cent. of wastiness being a negligible quantity. The most important point that the experiment has cleared up is that the pines do not improve in colour after coming under the influence of the cool temperature, and that they will not colour up satisfactorily after removal therefrom. Again, the experiment shows that it is quite unprofitable to ship pines not properly coloured, and it becomes imperative to ship only thoroughly coloured pines by cool chamber to secure paying prices. With regard to the value of the pines, it is seen that well-coloured 1 ¹/₂ lb. to 2 lb. fruits fetched 8s. per dozen, and if this price could be maintained shipment by cool chamber could be made most profitable. Of course, it would entail a great deal of trouble and care to ensure a large shipment arriving in a uniform condition, but even if the fruit then only realised an average price of 6s. per dozen it would leave a very good margin of profit, from a business point of view (if not from that of the grower), as I shall endeavour to show later on in this report.

VENTILATED HOLD SHIPMENT :
(Temperature 68° to 83° to 49° F.)

Experiment Number	Weight of Fruits in Pounds	Number of Fruits to Case	Colour When Packed	Remarks by Commercial Agent
A 4	1 ¹ / ₂	12	Full Yellow	All mouldy
C 1	1 ¹ / ₂	12	do.	All bruised, but of good colour
C 1	1 ¹ / ₂	12	do.	All bad except one, that of good colour

Taken by itself, the condition on arrival of C.1 would indicate great possibilities of shipment by hold if the fruit were packed in single layers so as to avoid bruising; but it will be seen, after reviewing the results noted below, that it is somewhat of a conundrum how this one package arrived, comparatively speaking, so satisfactorily.

Experiment Number	Weight of Fruits in Pounds	Number of Fruits in Case	Colour When Packed	Remarks by Commercial Agent
A 5	1½	12	Pale Yellow	Rotten, over-ripe
A 5	1½	12	do	On fully ripe side. All bruised at side where in contact with upper layer
A 6	1½	12	do.	Stalks sealed. Badly bruised and mouldy
C 4	1½	12	do.	One sound, others slightly bruised
C 4	1½	12	do.	Nine bruised, three good
C 4	1½	12	do.	All slightly gone, bruised
C 5	1½	12	do.	Colour warm, all slightly bruised. Crowns ragged and yellow
C 5	1½	12	do.	Two in fairly good condition. Eyes discoloured, ten bruised
C 5	1½	12	do.	All bruised. Dark spot in centre. Otherwise sound
C 5	1½	12	do.	Dirty looking pine. Not recommended
C 5	1½	12	do.	Two good and of good colour. Others fermenting

Upon the face of it the results indicate that with careful packing in single layers pale yellow pines might possibly be shipped successfully in the hold, but there is also no doubt that a certain degree of wastiness would have to be anticipated. This experiment will have to be repeated next summer with single layer parcels, special precautions being taken against bruising.

Experiment Number	Weight of Fruits in Pounds	Number of Fruits in Case	Colour When Packed	Remarks by Commercial Agent
A 7	1½	12	Light Green	All more or less bruised and fully ripe
A 7	1½	12	do.	All ripe, three sound
A 8	1½	12	do.	Sealed stalks, all mouldy and rotten
D	1½	12	do.	Crowns bent, five specked, others sound, fair colour
D	1½	12	do.	Five bad, rest fair, colour good
E	1½	12	do.	Two bad, nicely coloured; crowns shrivelled and ragged
E	1½	12	do.	Two bad, rest in good condition and reddish colour, eyes slightly black in one or two

The light green stage of maturity is that in which one would instinctively cut pines for shipping by hold, so that they might colour up in transit. It is satisfactory to note that the results give some promise of single layer parcels carrying. As I have already indicated, how-

ever, in the case of the pale yellow stage, it is desirable to experiment further in this connection with the next summer crop in order to ascertain what the degree of wastiness may amount to.

Experiment Number	Weight of Fruits in Pound s	Number of Fruits in case	Colour When Packed	Remarks by Commercial Agent
A 9	1 $\frac{1}{2}$	12	Black Green	Deeper colour than Cool Chamber, all speckled, signs of bruising
A 9	1 $\frac{1}{2}$	12	do.	All bruised, dirty eyes, some mouldy
A 9	1 $\frac{1}{2}$	12	do.	Mouldy, black at core
A 10	1 $\frac{1}{2}$	12	do.	Stalks sealed. All badly bruised
A 10	1 $\frac{1}{2}$	12	do.	Over ripe and mouldy
A 10	1 $\frac{1}{2}$	12	do.	All mouldy
B 1	1 $\frac{1}{2}$	12	do.	Two good, ten bruised
B 3	1 $\frac{1}{2}$	12	do.	Do. do.
B 3	1 $\frac{1}{2}$	12	do.	Five bruised, fully ripe, full colour
B 6	1 $\frac{3}{4}$	12	do.	All bruised, dirty looking
B 6	1 $\frac{3}{4}$	12	do.	Do. do.
B 6	1 $\frac{3}{4}$	12	do.	Full colour. Badly bruised, black at core and rotten
C 6	1 $\frac{3}{4}$	12	do.	Bruised, good colour, crowns squashed and discoloured
F	1 $\frac{3}{4}$	12	do.	All bad, bottom layer worse than top
F	1 $\frac{3}{4}$	12	do.	All bad, some fermenting
F	1 $\frac{3}{4}$	12	do.	One sound pine of fairly good colour, crown crushed, turning black
G	1 $\frac{1}{2}$	12	do.	Five good full colour. Somewhat dark eyes
G	1 $\frac{1}{2}$	12	do.	One sound. Rest good colour, but bruised
G	1 $\frac{1}{2}$	12	do.	Fruit all bruised and discoloured

It is clear from the above details that the black green pines coloured up well in transit, but they did not carry any better than the more mature pines; if anything, they arrived a bit worse than the light green pines, and, if this is actually so, it shows, what might be expected, that pines in this stage are more readily bruised in picking, handling and in transit than more mature fruits.

Of the 45 dozen sent by hold 19 were rotten, 19 realised 1s., 3 3s., and the remainder 2s. 6d. per dozen.

Upon the face of it there seems little to be learned from the results of this hold experiment except the futility of packing in double layers and the necessity for a series of fresh experiments next summer with single layer parcels. But there are two other features which are clearly borne out by the results—one is the certainty of a heavier percentage of wastiness (*e.g.*, a certain proportion is sure to go mouldy *en route*), the other is the depreciation in market value consequent upon the shrivelling of the crown, which cannot very well be obviated.

At its very best, then, ventilated hold shipment entails a certain amount of risk, because no two steamers seem to be fitted alike in this respect; and, as I have pointed out before, the manipulation of the

ventilated hold stowage depends largely upon the personality of the officer in charge.

These two factors will tend towards wastiness. Again, the crowns are certain to lose considerably in appearance, and, lastly, whilst the pines may be relied upon to ripen up, even to over-ripeness, they will not ripen up bright and clean. They will in consequence only command a moderate price, which, taking one consideration with another, cannot be set any higher than 3s. 6d. per dozen.

SUMMARY.

Briefly, the net result of the experiment is (1) our small pines in two layer parcels carry quite well enough by cool chamber; (2) they open up in the same condition as they happen to be when placed under the influence of the cool temperature, both fruit and crowns; (3) the richer the colour, and the brighter and cleaner the pine, the better the price; (4) one and three-quarters and two pound pines are preferred to the one and a half pound pine; (5) that for this small pine a stalk of 1½ inch is sufficient, and pines with stalks are preferred to pines without, and carry better; (6) there appears to be some advantage in sealing the stalks; (7) so far as the mid-summer crop is concerned, experiments with hold stowage will have to be repeated *de novo*.

FREIGHT CHARGES.

The question of freight has a very important bearing upon the prospects of pineapple export. The freight at the time the first shipment was made stood at 70s. per ton (40 cubic feet) for cool chamber, as against the quotation of 55s. made by the Union Castle Company for pineapples from Cape ports. As soon as it was recognised that the fruit could be shipped successfully by cool chamber the Minister of Agriculture had the Shipping Company approached with a view to some reduction being made, especially in consideration of the much lower rates offered to Cape pineapple growers.

As a result of the negotiations a slight concession has been made in so much that shipments of ten tons (400 cubic feet) and over will now be carried in the cool chambers of the intermediate steamers at 60s plus primage per ton, and, after the expiry of six weeks, the slightly reduced rate will hold good for the regular mail steamers as well.

Freight charges have a direct bearing upon the packing of the fruit, and even if there happens to be a certain amount of wastiness to be put up with by shipping double layer parcels in cool chamber (from the result of the experiment little is to be expected), it will, I think, be more profitable to ship in two layer than in single layer boxes. There are two reasons for this—firstly, the two-layer box can be made from less wood, so it is cheaper, and, secondly, its cubic measurements are less, so freight is proportionately reduced.

In shipping upon a large scale one would consider the desirability of having different sized boxes for the several sizes in which the pines run, so as to save as much in freight as possible; but, in general practice, growers would find it more convenient to use uniform boxes. Thus for the double layer packing a box measuring inside $22\frac{3}{4}$ in. x $11\frac{1}{2}$ in. x $7\frac{1}{2}$ in. and over all 1 1-3rd cubic feet is about the most suitable, holding, as it does, a dozen $1\frac{1}{2}$ lb. and $1\frac{3}{4}$ lb. pines and nine 2 lb. pines. For single layer packing a box 25 in. x 22 in. x 5 in. inside carries a dozen $1\frac{1}{2}$ lb., $1\frac{3}{4}$ lb. or 2 lb. pines and measures over all nearly 2 cubic feet—21 such boxes running to the ton.

Working on the ten-ton basis, and with particular reference to $1\frac{1}{2}$ lb. and $1\frac{3}{4}$ lb. pines by cool chamber, one is enabled to ship 300 dozen in cool chamber for £30 plus 10 per cent. primage and 25s. for shipping in the two layer parcels, whilst only 210 dozen could be shipped in single layers. To ship the same quantity (300 dozen) in single layer parcels the freight would be £42 17s. 1d. plus primage and 35s. 7d. for shipping, and increased charge of £13 7s. 8d. or 10d. per dozen.

PROFIT IN EXPORT.

In order to indicate that there is money in the export of pine-apples, and better returns by the safer and more expensive method of shipment, I have prepared the following statements upon a ten-ton basis, two layer parcels, 1 1-3rd cubic feet each, being utilised for cool chamber shipments and single layer parcels, 21 boxes to the ton, for shipment by ventilated hold:—

COOL CHAMBER SHIPMENT.

Ten tons, equal 400 cubic feet, 300 boxes at 1 1-3rd cubic feet each. Say:—

50 boxes of 2 lb. pines, 9 fruits to package	450 pines.
75 boxes of $1\frac{3}{4}$ lb. pines, 12 fruits to package	900 pines.
175 boxes of $1\frac{1}{2}$ lb. pines, 12 fruits to package	2,100 pines.
<hr/>	
300 boxes	3,450 fruits.
<hr/>	

Pines all to be full coloured, bright and clean, with nice crowns—i.e., at least $3\frac{1}{2}$ inches high.

Average price, 6s. per case. (In fixing the average price at 6s. per case it is to be noted that similar pines brought 8s. per dozen in our experimental shipment. It is true the Commercial Agent puts the figure at 4s. 6d. to 5s., but such prices are not good enough, and a 6s. minimum should be fixed for the sale of the pines.)

At 6s. 300 cases will realise gross £90. Against this the following charges have to be allocated:—

	£	s.	d.
Freights and shipping at 62s. 6d.	31	5	0
London charges at 10 per cent.	9	0	0
300 boxes at 6d. each	7	10	0
Packing at 3d. per box	3	15	0
Railage (say 6,000 lbs. from Pinetown to Point) ...	0	18	0
	<hr/> £52 8 0 <hr/>		

In basing the price of the boxes at 6d. each, I am relying upon our wattle wood boxmakers being able to turn out a suitable crate at this figure, and if they cannot then boxwood (not "special" as imported for naartjes) will have to be imported from abroad that can be put together at this figure. An outlay of £52 8s. will then bring a net return of £31 12s. for 3,450 pineapples, or 267½ dozen, or 2s. 7d. per dozen.

At the time the main crop of small pineapples comes in, despite the fact that pineapple culture has largely fallen off in Natal, the market is so glutted that growers do not get 6d. net per dozen for their crop. However, to ship pines successfully by cool chamber and so insure top prices, a good deal of trouble has to be taken, and so, for the sake of argument, I will put down such fruits at 1s. 6d. per dozen (a profitable figure), and still leave an extra 1s. per dozen as an inducement to export.

VENTILATED HOLD SHIPMENT.

Fruit to be shipped green and in single layer parcels. Ten tons, equal 400 cubic feet, 210 boxes, about 2 cubic feet each, or 210 dozen pines, at 3s. 6d. per case, £36 15 0 gross.

Charges :	£	s.	d.
Freight and Shipping	13	15	0
London Charges, at 10 per cent.	1	9	6
210 boxes, at 7d. each	6	2	6
Packing, at 3d. per box	2	12	6
Railage	0	18	0
	<hr/> £24 17 6 <hr/>		

Leaving a net balance of £11 17s. 6d., or only 1s. 1d. per dozen.

CONCLUSION.

It is too early to speculate, but I hope, on the result of my later experiments, to show that quite good returns can be secured by shipping the large Cayenne pines, if things are gone about in the right way, and there leave the future of their own prospects, and, incidentally, of the Colony in respect of pineapple culture, in the hands of the growers themselves.

CLAUDE FULLER,
Government Entomologist.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

* * * *Under the above heading we propose to publish each month in future short paragraphs on subjects of interest to the practical farmer, by recognised experts in agriculture and allied sciences.*

THE safest way for those who are about to make their first attempt at poultry-raising is to start in a small way with a few fowls, and learn the business thoroughly before making large investments. Mistakes will be made and many problems will be presented for solution before success in any large measure will be attained. As soon as it is found to be a paying investment, more capital may be put into the plant.—*C. Arthur Bell.*

The cultivation and feeding of lucerne marks the highest development of our modern agriculture. Lucerne is one of nature's choicest gifts to man. It is the preserver and the conservator of the homestead. It is peculiarly adapted to a country with a Republican Government, for it smiles alike on the rich and on the poor. It does not fail from old age. It loves the sunshine, converting the sunbeams into gold coin in the pockets of the thrifty husbandman. It is the greatest mortgage lifter yet discovered.—*Geo. L. Clothier.*

BREEDING.

A knowledge of the principles of breeding lies at the foundation of the meat manufacture. The richest kinds of food may be used in feeding stock; but these will be comparatively useless if the animals are of a description which do not readily assimilate food, or are ill-thriving animals, as such are designated in practical phraseology. But, important as a knowledge of the principles of breeding undoubtedly is, it must be confessed that it is an intricate subject, and one upon which a variety of opinions are entertained.—*Robert Oliphant Pringle ("Live Stock of the Farm")*.

HOW PLANTS OBTAIN THEIR WATER.

It is from capillary water that agricultural plants, for the most part, obtain the water necessary to their growth. In order that they may make their best development, the soil must be in such physical condition that the roots of plants can readily penetrate it and ramify through it;

it must contain sufficient capillary water to supply the needs of the plants; and this water must be renewed as it is taken up. There should be no large spaces, since these cause the soil to dry out readily and prevent the development of the many fine branching rootlets necessary to the best development of plants.—*George H. Failyer.*

SORGHUM FOR PASTURE.

Sorghum furnishes excellent pasture for horses and mules not at work, for all kinds of cattle and for sheep and swine. As it grows up again when eaten down, it is not necessary that it shall be so far advanced as corn [mealies] before the pasturing begins. When the area of sorghum pasture is large in proportion to the stock to be pastured on it, then pasturing should begin early, and *vice versa*. But in no case should it be eaten down until it has made a growth of several inches from the ground, as when young and tender it is easily injured by live stock feeding upon it.—*Thomas Shaw ("Forage Crops.")*

FOOD VALUE OF FRUIT.

The extended use of fruit in the diet is certainly justified on the ground of palatability, food value, and esthetic consideration, but there are those who seek a further justification on the score of hygiene. It is commonly conceded that most fruits are laxative, and it seems probable that they owe this property to the considerable amount of water which they contain, to the salts in solution, or to the irritating crude fibre, small seeds, or other indigestible materials present, or to all these together. Man seems to crave and require some acid in his diet, and the citric, malic, and other fruit acids are undoubtedly wholesome.—*C. F. Langworthy, Ph.D.*

PLOUGHING.

One of the chief objects of ploughing is to pulverise the soil. The plough may invert it in the most perfect manner and bury surface vegetation, but if it fails to do the greater part of the fining of the soil as well and leave it in such a condition that the harrow and cultivator cannot complete the work in the cheapest and best manner, it is seriously defective. Since ploughing is a slow and expensive operation, and the plough is by far the best implement that has been devised for moving and inverting the soil, for destroying plants, and preparing the land for surface tillage, and for loosening and pulverising it, its efficiency and the power required to plough become of prime importance.—*I. P. Roberts ("The Fertility of the Land.")*

SOURING OF MILK.

When milk is exposed to the air, the sugar which it contains is rapidly oxidised, and lactic acid is formed; this formation, singularly enough, takes place with greatest rapidity at or about that at which the milk is taken from the cow. The moment the formation of lactic acid begins, the milk begins to sour, the rapidity of the process depending upon the temperature. Milk, when cooled down immediately after it is drawn from the cow, can be put away in large vessels and be transported to a distance without injury; it keeps long, it is sweeter, and this is in consequence of so little, if any, of the milk-sugar in it turning to lactic acid.—*John Darton ("Cottage and Dairy Farming.")*

LAND FOR IRRIGATION.

In choosing land which is to be irrigated a careful examination should be made of the character and depth of the soil, its behaviour when irrigated, the slope of the evenness of the surface, the presence of injurious salts, and the facilities for drainage. One of the best indications of the character of the soil is the native vegetation which grows on it. When sagebrush, buffalo grass, or cactus is found on a tract, it is reasonably certain that the soil is fertile, easily tilled, and well drained. The plants named are but a few out of a large group which grow on good soil, easily irrigated. On the other hand, the presence of greasewood, saltwort, salt weeds, or other similar plants is indicative of a heavier soil, less easily cultivated, and containing more or less of the injurious salts usually grouped under the common name of alkali.—*S. Fortier.*

THE BEAN.

The bean belongs to one of the most important families of economic plants with which man has to deal. While there is a great variety of plants belonging to the pulse family, of which the bean is a member, varying in size from low annual plants to tall, broad, spreading trees, there are few members of this group which possess greater economic importance than does the bean. Besides furnishing wholesome, nourishing food for man and for animals, this group of plants provides the agriculturist with a means of securing from the great store of nitrogen in the air, by the use of one of its members in the crop rotation of his farm, a sufficient quantity of nitrogen to replenish that taken from the soil by other agricultural crops. Not all leguminous plants provide food for both man and beast and at the same time increase the fertility of the soil upon which they grow. The bean, however, is one of those which has this capability. It is therefore one of the most desirable crops to use in the farm rotation, as well as in market-garden work.—*L. C. Corbett.*

The Position of East Coast Fever.

LISTS OF OUTBREAKS DURING FEBRUARY AND MARCH.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st February to 20th March:—

Dundee District.—Outbreak on farm "Links Buffalo" (east of main line of railway).

Durban County.—Outbreak on Experiment Farm at Winkel Spruit.

Klip River District.—Outbreaks on Ladysmith Town Lands, on farm "Balbrogie"—sub-division of "Dwar's River"—and on farm "Beauviale" (all west of main line of railway).

Utrecht District.—Outbreak on farm "Zoetmillsrivier."

Krantzkop District.—Outbreaks on farms "Kaalhoek" and "Dingley Dell."

Pietermaritzburg City.—Outbreaks among cattle of Mr. W. Boyd, Morecom Road, and Mr. Kenmuir, College Road.

Umgeni District.—Outbreaks at Bishopstowe and on farms "The View" and "Shallow Drift."

Lion's River District.—Outbreaks on farms "Colbourne," sub-division of "Welgevonden" (east of main line) and "Brookdale," sub-division of "Drie Spruiten" (west of main line).

New Hanover.—Outbreaks on farms H. Hohls' portion of "Doornkop," Noodsberg Area, "Kruisfontein," Albert Falls Commonage.

Camperdown.—Outbreaks on farm "Slangspruit." (This farm is in the Umgeni Division, but for East Coast Fever purposes is considered in the Camperdown District.)

Isopo.—Outbreaks on farms "Klipgat," "Kelston," "Weverley." It has now been ascertained that the disease has been in existence on these farms since December last, and, owing to this and the fact that cattle had been allowed to leave under permit, I fear it will be found that other farms are also infected.

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of Victoria County, Vryheid, Ngotshe, Babanango, Paulpietersburg, Umsinga.

Farm and Garden Notes.

By GEO. CARTER, F.R.H.S.

FARM WORK FOR APRIL.

WHERE water is available for irrigation, or where the ground is of a damp but still porous nature, April is the favourite month for sowing Lucerne. Perhaps a few general notes on the sowing of this crop, intended for those who are sowing for the first time, will not be out of place.

Let me say first of all that there are very few farms in this Colony where Lucerne will not grow fairly well and form a most useful addition to other green crops, and even hay crops. The only warning that is really necessary is: beware of clay and shale where this is near the surface. I am well aware that to grow this crop to perfection, and to turn off six to eight crops in the season, land such as that found in Weenen and Muden is a necessity. Lime, a deep, loamy subsoil, and plenty of water for irrigation, are here found in such perfection that, search the world as we may, we cannot find more perfect conditions. But if the ordinary dry land farmer can get two good crops in a season then a Lucerne crop will pay him handsomely, and most good mealie land will grow this quantity well. A crop may pay very handsomely without having to be sent to the market in bales. Lucerne makes excellent hay for the home barns; is an excellent feed for the pigs; a perfect cut of green food for the stable animals all through the year; and, best of all, it is there for years when once well established.

Now, the first point to make—and ignorance of this is a very fertile cause of failure—is to thoroughly prepare the land. See that it is the best you have, and that the subsoil is deep and porous, and then plough deeply and thoroughly. Make the surface of the land like a seed bed. A crop which is going to last you for twenty years is well worth as much work in preparation as you can find time to put into it, and half the battle with a lucerne crop is in this good start. Next, get the very best seed you can find—price is a very secondary consideration in such a crop as this. If you intend sowing a considerable area buy a sieve, 24 meshes to the inch, and put all the seed over this before sowing, thus making assurance doubly sure that you sow no “dodder” in your field. However careful your seedsman may be, he cannot honestly give you any guarantee that there are not *two* seeds of “dodder” in five million seeds of lucerne sold, and these two seeds left in and allowed to seed again and again will soon ruin your field. Make it your business to find out what a “dodder” plant is like, for the appearance of this

parasite is the one thing you will have to guard against next year, until the field is well established.

I don't know whether you should sow in drills or not. When down in Muden a few days ago I saw fields which had been sown in both ways, and do not think there was much difference, either in cleanliness or yield. There is much difference of opinion on this point, but it does not seem to matter much. If in drills make the drills 21 inches apart, *and see that the seed is not buried more than half an inch deep.* It will germinate on the surface in good weather, but will seldom get through a full inch of soil. If sown broadcast you will need to use 20 lbs. of seed to the acre; if in drills, 15 lbs. will be enough.

ABOUT SEED-REAPING.

The reaping of seed from such crops as Beans, Millets, Buckwheat and others will be in hand just now in many districts. As one who knows and handles many seeds of Natal growth, let me say that not one farmer in ten really does justice to, or gets the most value out of, his seed crop, and the men who reap and market seed crops as they ought to be reaped and marketed could be counted on the fingers and toes. I have bought tons of Japanese Millet seed containing more than 10 per cent. "mbuya" seed, and quite unfit for sale until it has been re-cleaned. Now, what I want to point out is that it pays handsomely to carefully prepare all seeds for market. Why should our seed oats be so inferior to those exported from the Western Province that all who want to buy Oats ask for Cape seed? Why is the merchant so willing to pay more for imported seed than he will pay for Natal produced seed? The answer is that Natal farmers as a whole have not yet recognised the necessity of working up to a high standard in the production of seed; and as long as this sort of thing continues we cannot hope to compete favourably with the imported article.

I strongly advise all those who reap seed crops of any sort to invest in a good Winnowing machine, with a well-graded set of sieves, and, if possible, to get one with two handles to ensure a steady continuance of draft. This good Winnower may cost you £10 or even £20, but it will astonish you how soon it will pay for itself. But get a good one. I am no believer in cheap machinery.

One of the greatest pleasures I have had recently consisted of buying certain seeds from Mr. W. F. Taylor, of Rosetta, which were as near perfection as possible, and I am sure Mr. Taylor will endorse what I have said on this point, and will say that it has paid him to take pains with all seeds.

Those who intend to plant fruit trees or roses this coming winter should now be busy preparing the ground, trenching all over wherever possible, and leaving the ground loose until planting. Unless done now,

while the ground is fairly moist, it will get all the more difficult as the weeks go by.

Nitro-Bacterine has been very much to the fore in many of the Home agricultural and horticultural papers recently, and the discussion is likely to continue for some time. The general results are just what one might have expected. On poor soils, naturally deficient in nitrogen, there can be no doubt that the bacteria are beneficial, and their addition to the soil, either by seed inoculation, of soil inoculation, or both, has resulted in largely increased crops. But in naturally fertile soils, or old-established gardens, the results have been *nil*. The results in Natal have been very similar. The best reports come from Bulwer, where the soil is naturally very poor indeed and very deficient in nitrogen. If any of our readers have got any definite results during this last season I am sure the Editor would like to hear of them. Nitro-Bacterine must not be treated with the scant respect which previous preparations of this kind have had. Here we have undoubtedly the original discovery in a business form, and we should make it our business to find out by experiment and reports how we are to use the discovery to advantage. Will those who have used it please report?

THE HOME GARDEN.

Of the flowering bulbs to be planted for spring flowering, Watsonias, Gladioli and Freesias should be put in at once. Do not be afraid of planting them well down. If you have ever tried to dig up the indigenous Gladioli or Watsonias (the pink one) you will know how well nature protects her children from the winter drought. These are down six to nine inches, sometimes more, and we should follow the lead of Dame Nature in our gardens. Sickly foliage and poor progress can generally be traced to shallow planting.

Of the different varieties of Gladiolus we find the most satisfactory to be the Dwarf type. There are some most delicate hybrids of this class. We have never known them to be attacked by insect pests to any serious extent, but the Gandavensis type are nearly always attacked by the stalk borer, and that just at the time when the buds are expanding.

This season we have bloomed the beautiful and pure white Watsonia Arderni to perfection. Its blooming period is from early November to the end of December. Height, $4\frac{1}{2}$ feet. Many of the bulbs throw out several flower spikes, and when the central spike is cut the side shoots succeed them quickly. We do not know a more beautiful or chaste white flower than this. It is perfectly hardy, always certain to bloom the first year. The bulbs increase rapidly, one single bulb generally forming six to eight more in one season.

You must try to grow Freesia Refracta alba from seed next year.

sowing the seed in August. This sweetly scented and graceful flower will bloom within twelve months from seed. This year it is too late for seed, and if you want to plant you must get bulbs.

It is time you were giving your violet plants attention, if you desire to get good blooms this winter. Try the application of a little Canary guano on them, either in a liquid or solid form. The Chrysanthemums, just now breaking into bloom, would also be the better for attention of the same sort.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

NATAL AGRICULTURAL UNION.

We have been favoured by the Secretaries of the Natal Agricultural Union with the following copy of minutes of the proceedings of a deputation of the Executive Committee to the Minister of Agriculture on the 26th February:—

The deputation consisted of Messrs. E. W. Evans (President), Rev. Jas. Scott, J. Marwick, H. Bazley, T. Burman, W. Craig, J. King, C. E. Hancock, with the Secretary, Mr. D. M. Eadie.

The President introduced the subject of discussion—*i.e.*, the report that the Shipping Ring had decided to raise the freights on mealies to 15s. per ton from 10s. per ton.

The Minister, in reply, stated that the Transvaal, O.R.C. and Natal were working to have the present mealie freight maintained and extended to mealie products, and hoped to be successful.

The President then introduced the question of whether there would be sufficient bottoms available to carry the mealies next season. He reckoned they would have to take about 25,000 tons a month for six months.

The Minister said the fixed intention was to maintain the mealie trade, and the matter of getting bottoms would not present a serious difficulty.

The President also raised the question of passing ungraded grain on its merits.

The Minister stated the Government would not allow ungraded grain to be shipped.

The President also spoke about the pressure of wharf regulations on shippers and the desirability of providing more convenient storage for large shippers.

The Minister promised to look into these matters.

The deputation thanked Mr. Deane, and afterwards heard Mr. T. W. Turner on the subject of experimental industries.

It was agreed that Mr. Turner should have an opportunity of addressing the Conference.

DURBAN COUNTY.

A SPECIAL meeting of the Durban County Farmers' Association was held in the New Germany Hall on the 21st February, with the president of the Association, Mr. Jas. McIntosh, in the chair. For the following report of the proceedings we are indebted to the *Natal Mercury*:—

The President called upon the secretary to read a letter addressed to him by the secretary of the Durban and Coast Society of Agriculture and Industry, which letter was to the following effect: "I beg to bring to your notice the fact that the above-named Society is extremely desirous of obtaining for future Durban shows as complete an exhibit as possible of the products of the three coast counties—Durban, Victoria, and Alexandra. To this end, as much space as you will need, and in a prominent position, will be granted gratis. There will be no objection to the producer of each article in the exhibit having his name and address attached. It is proposed to award the Society's gold medal to the best exhibit of the three. Your Association's hearty co-operation in circulating the fact, and inducing its members to contribute products and in supplying the Society with the entry and particulars for the catalogue—in short, in making the whole entry as from your Association—is kindly requested. It is a matter requiring considerable notice to inaugurate, and it is trusted that in moving at the present sufficient time has been allowed."

The President asked for an expression of opinion with regard to the advisability, or otherwise, of having the county represented at the show in the way suggested by Mr. Morley.

The Secretary thought that the matter required a thorough going into, as the letter did not seem explicit enough, and he suggested that before any steps were taken, Mr. Morley be interviewed to elicit further information with regard to the way this exhibit is to be arranged.

The President said he liked the idea immensely, and though they might make no great display, it was always a beginning. He thought it much better to join the great Durban Association in this respect than to hold a miserable show of their own, which they had some idea of doing some time ago. He thought these little local shows were rather overdone, and their time would soon be past. As a matter of fact, this was a county affair, and the whole county ought to be roused into enthusiasm. There was nothing which led better to developing the resources of the country.

Mr. H. W. Freese thought the idea very good, and it was arranged that the president and secretary should, as soon as possible, interview Mr. Morley to get the necessary information, and report to the next meeting, to be held at the end of March.

Correspondence.

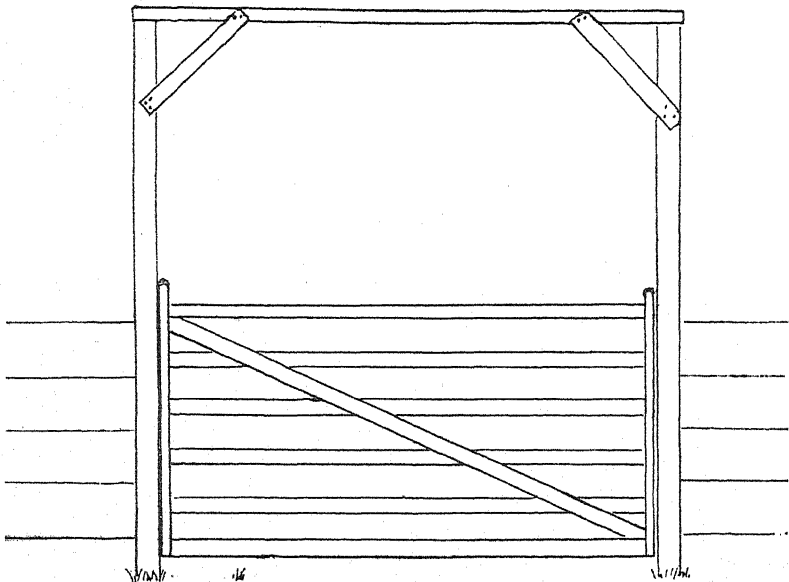
** * Correspondence is invited on topics of interest to farmers. Letters should be written on one side of the paper only; and while a nom-de-plume may be used, all letters must be accompanied by the name and address of writer. The Editor is not responsible for the opinions of his correspondents: the letters which appear in these pages are published as the opinions of the respective writers, and their insertion does not necessarily imply editorial concurrence with the views expressed.*

BRACING GATE POSTS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—No doubt there are many of your readers who are troubled with "sagging" gates—with loose posts, so that the gate has to be lifted and swung around. Stays are all very well for a time, but they work loose and come apart from the post.

The accompanying sketch, which I have made from a photo. in an



American paper that I take in, illustrates a useful device for keeping the gate posts apart. As you will see, the posts are twice as long as the usual gate post, and are kept from falling towards each other by a horizontal stay at the top.

Hoping that this will be of interest to some of your readers,—I am, etc.,

T. M. J.

CORN-PONE.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In connection with your recent articles, "Some Useful Maize Dishes," the following recipe for making the old-fashioned American corn-pone may interest some of your readers:—

Upon one quart of mealie meal (white preferred) pour just enough boiling water to scald it through; stir it thoroughly, let it stand until cold, then rub into it a piece of butter the size of a walnut, and add a little salt. Beat two eggs until light, without separating, and add to the meal; mix well, add one pint of buttermilk or *sour* milk, and beat until smooth. Dissolve one teaspoonful of soda in a tablespoonful of boiling water, stir into the mixture, then turn into a well-greased baking pan, and bake in a quick oven for 35 minutes.—Yours, etc.,

E. J.

BAGWORMS.

The following letter has been received by Mr. Claude Fuller from a correspondent at Umzumbi (South Coast):—

"DEAR SIR,—I have just been reading your article on the Bagworms. I noticed on a number of thorn trees thousands of the bagworms, and the trees were nearly dead from them last year. Then I saw a large flock of *Hloghlogus*, or chucks (birds that build on the reeds and trees overhanging rivers), always in the trees, and out of curiosity I sat on my verandah, within a few yards of the tree, and watched them eating the worms. They seem to have great trouble in getting the worms out of the bags, but they persevere, and if a bag falls to the ground they fly down after it and get the worm out. Last year they reduced the Bagworms so much that only a few were left, and this year they have finished them.

"Do you know of any mischief these birds do, as in our experience they seem to do a lot of good, but then we have encouraged them round the house and store by feeding them in the yards with the poultry, and they are very tame when they are about; but just now they have disappeared, though we expect to see them back again in the nesting season."

In the course of his reply Mr. Fuller wrote as follows:—

"The bird to which you refer is a species of *Sitagra*, of which there are two varieties in Natal, and which depend, to a very great extent, upon insects for their food supply. When insects are scarce they may resort to grass seed and berries, and perhaps fruit, but at any rate their depredations in this connection do not assume any economic importance."

Meteorological Returns.

Meteorological Observations taken at Govt. Stations for Month of February, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heavy'strain-fall in 1 day.		Total for Year from July 1st, 1908.	Total for same per'd from July 1st, 1907.
	Maximum.	Minimum.					Fall.	Day.		
Observatory ..	81.5	67.6	87.1	57.1	4.27	18	1.33	21st	28.50	24.49
Stanger ..	83.6	66.4	97	60	4.14	12	1.53	20th	30.42	34.85
Verulam ..	86.9	66.6	95	60	2.45	13	1.26	20th	27.59	28.10
Greytown ..	78.5	53.5	95	45	4.69	10	.95	4th	34.45	30.45
Newcastle ..	81.5	—	94	—	13.39	17	3.50	2nd	—	31.94
Mid-Illovo ..	77.4	59.2	88	51	5.09	16	2.20	21st	32.46	28.76
Estecourt ..	78.4	57.5	92	48	4.67	19	.68	16th	24.46	23.53
Bulwer ..	—	—	—	—	9.32	22	2.25	2. th	45.80	37.44
Ixopo ..	—	—	—	—	3.93	15	1.51	21st	27.55	—
Imbizana ..	81.2	64.3	90	55	3.78	13	1.20	21st	31.31	28.86
Port Shepstone ..	87.0	64.7	90	50	3.30	6	1.00	19th	30.92	29.51
Richmond ..	75.9	58.3	88	50	7.94	17	4.36	20th	42.08	32.49
Maritzburg ..	78.7	59.7	90	52	3.48	15	1.72	20th	28.19	29.51
Howick ..	76.7	57.7	88	51	4.09	14	1.36	20th	31.49	31.93
Lidysmith ..	—	—	—	—	7.43	18	2.80	16th	—	—
Dundee ..	77.7	59.6	90	50	6.47	14	1.52	5th	35.88	24.21
Weenen Gaol ..	91.2	59.6	101	53	2.89	20	.64	15th	27.36	24.82
Krantzkloof ..	76.9	62.1	89	57	5.74	17	2.16	21st	31.61	—
New Hanover ..	83.6	58.8	92	50	3.68	19	.70	20th	32.36	33.03
Krantzkop ..	82.9	74.3	94	68	4.40	18	1.34	20th	27.09	—
Charlestown ..	74.5	54.5	81	47	12.29	17	1.95	5th	40.04	23.04
Nqutu ..	78.2	53.7	84	66	3.95	9	1.02	16th	32.83	—
Mtunzini ..	83.7	61.8	97	40	9.86	8	4.20	6th	49.37	39.57
Hlabisa ..	81.6	62.1	88	55	6.39	9	2.00	6th	39.45	26.15
Melmoth ..	78.3	61.8	91	56	3.64	18	1.44	21st	25.74	21.12
Umbombo ..	81.4	62.5	89	56	2.57	12	1.59	21st	37.45	26.45
Point ..	—	—	—	—	4.07	12	1.33	20th	32.37	34.19
Lidgetton ..	78.3	53.7	90	44	5.67	18	1.18	20th	33.72	—
Ingwaruma ..	84.1	57.3	96	35	6.25	14	1.90	20th	—	27.89
Mahlabatini ..	84.0	50.1	90	44	3.53	9	1.60	20th	29.14	22.98
Empangeni ..	91.0	62.5	98	57	5.46	6	1.56	21st	32.17	33.30

Meteorological Observations taken at Private Stations for Month of February, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain- fall in 1 day.		Total for Year from 1st July, 1908.	Total for same period from July 1st, 1907.	
					Fall.	Day.			
Adamshurst	91	49	3.72	16	0.51	8th	28.93	—	
Hilton	85	50	4.63	19	1.53	2d	33.58	30.98	
P.M.B., Botanical Gardens ..	—	—	3.85	15	2.04	20th	29.06	—	
Ottawa	—	—	2.79	11	1.37	21st	27.90	27.85	
Mount Edgecombe ..	—	—	3.89	10	2.40	21st	29.88	29.43	
Cornubia	—	—	3.58	—	—	—	—	22.19	
Milkwood Kraal	—	—	2.74	—	—	—	—	17.14	
Blackburn	—	—	2.59	—	—	—	—	19.19	
Saccharine	—	—	2.92	—	—	—	—	20.19	
Umhlangeni	—	—	4.24	14	2.10	20th	33.03	—	
Equeefa	90	60	5.37	13	4.11	21st	31.69	29.43	
Umzinto, Beneva	—	—	5.34	7	4.40	20th	31.32	29.85	
Harden Heights	—	—	3.46	11	1.44	20th	—	—	
Reit Vlei	—	—	3.06	16	0.60	4th	25.56	21.38	
Bramholme	98	58	8.47	20	1.95	21st	50.84	53.74	
Cedara—Hill Station ..	87	49	4.77	19	1.80	20th	24.12	—	
„ Vlei Station	84	47	3.71	18	1.47	20th	24.97	26.89	
Winkel Spruit	85	60	4.68	11	2.49	20th	30.38	30.69	
Weenen	94	65	3.02	14	0.58	16th	—	—	
Gint's Castle	74.4	41.4	10.93	25	1.91	16th	39.43	21.37	

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of February, 1909 :—

COLLIERY.	Average Labour Employed.				Output.	
	Productive Work.			Unproductive Work.*	Total.	Tons. Cwt.
	Above Ground	Below Ground.	Total.			
Natal Navigation ..	392	636	1,028	7	1,035	24,252 0
Elandslaagte ..	333	689	1,022	9	1,031	16,342 14
Dundee Coal Co. ..	296	339	635	—	635	12,189 12
Glencoe (Natal) ..	193	422	612	62	674	12,040 19
St. George's ..	215	420	635	—	635	11,337 0
Durban Navigation ..	181	389	570	—	570	10,389 0
Natal Cambrian ..	207	397	604	6	610	9,878 14
South African ..	98	249	347	33	380	9,588 9
Talana ..	158	399	557	28	585	6,044 11
Newcastle ..	86	397	483	—	483	5,396 12
Natal Steam Coal Co. ..	93	219	312	18	330	4,898 8
Hiobane ..	98	189	287	34	321	2,910 11
Hatting Spruit ..	73	169	242	16	258	3,538 17
Ramsay ..	106	229	335	—	335	2,910 11
West Lennoxton ..	67	121	188	—	188	2,276 5
Central ..	33	76	109	—	109	1,044 11
Zululand ..	24	26	50	—	50	466 5
Ballengeich ..	—	—	—	97	97	93 10
Dumb Mountain ..	2	—	2	—	—	3 0
Totals ..	2,652	5,366	8,018	310	8,328	137,822 0
Corresponding month, '08	2,466	5,625	8,091	432	8,523	138,171 15

	Productive Work.			Unproductive Work.	Total, Feb., 1909.	Total, Feb., 1908.
	Above Ground.	Below Ground.	Total.			
Europeans ..	193	151	347	52	399	398
Natives ..	913	3,488	4,401	199	4,600	4,599
Indians ..	1,516	1,724	3,270	59	3,329	3,526

* Cost Charged to Capital Account.

Mines Department, Maritzburg, 5th March, 1909.

CHAS. J. GRAY,
Commissioner of Mines.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of February, 1909 :—

	Tons.	Cwt.
*Bunker Coal ..	69,583	3
Coa Exported ..	38,634	0
Total	108,217	3

Includes 1,238 tons taken by H.M. Transports.

Customs House, Port Natal, 1st March, 1909.

CHAS. WINSER,
Collector of Customs.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	T. Kirkness ..	Coalfontein
A. B. Koe ..	Portion of Estcourt	"	C. Wortmann ..	Rensburg Drift
		"	Cooke Bros. ..	Cypherfontein
		"	A. W. J. Hattingsh ..	Koplaagte
A. C. Williams ..	Utrecht ..	Lungsickness	R. Mattison ..	Calcote
		Scab	B. & H. Hattingsh ..	Dagernad & Welgeoon
		"	S. Grobler ..	Schuin's Hoek
		"	H. A. Potgieter ..	"
		"	W. du Plessis ..	Vaalbank
		"	Uninang ..	"
		"	C. Webb ..	Waterval
		"	M. van Rooyen ..	"
		"	M. Hattingsh ..	Boschhoek
		"	Umbanja ..	Grootvlei
		"	J. P. Botha ..	Spitskop
		"	J. Z. Moolman ..	Gre n Viei
		"	C. Emmett ..	Politick
H. Van Rooyen ..	Ba'anango ..	"	K. nksa ..	Vaalbank
		"	Ngcta ..	Pandasgrop
		"	C. P. Lauretitz ..	Wydgelegen
		"	L. Potgieter ..	Gelykwate
		"	Hende ..	Aandasgrap
		"	F. C. Scheepers ..	Rooipoort
		"	C. Van Rooyen ..	Paardepoort
		"	G. Van Rooyen ..	Melboom
		"	Andrias ..	"
L. Trenor ...	Alfred ..	Lungsickness	L. Labuschagne ..	Friskewacht
		Scab	Shlwana ..	Location
		"	Yalwayo ..	"
		Lungsickness	Dumas ..	Location
		"	Uyimbi ..	Location
		"	Mlotshwa ..	Msingopansi's Kraal
		"	M. Clothier ..	Slexcel
		"	E. M. Etheridge ..	Selhurst
		"	John Ryan ..	Norburg
		"	J. J. Oosthuis ..	The Gorge
		"	J. H. Payn ..	Burnside
		"	Byela's Kraal ..	T. Fynn's Location
		"	H. M. Raw ..	Elands Drift
		"	Elijah ..	Sheepwalk
		"	Mashuma ..	Hoj e
		"	R. Fann ..	Blackwater
		"	F. Mzizi ..	Lot 1, Enquabeni
		"	E. Mzizi ..	Lot "F," Enquabeni
		"	J. T. Clothier ..	Whitecliff
		"	J. J. Oosthuis ..	Harding Town Lands
		"	Swenyas ..	Blackwater
		"	G. Larkan ..	Antioch
		"	Injongaved ..	Rydal Mount
		"	Mdingwas ..	Lot 3
		"	C. Knox ..	Knoxwood
		"	Sigumu ..	Lot F.
		"	Ndhlankunzie's Kral ..	Location
		"	Noganes ..	Harding Gate
Acting—J. Ralfe ..	Lion's River ..	Scab	Mncanaka's Kraal ..	Mount Pleasant
		"	A. C. Thomson ..	Lion's Bush
C. T. Vaughan ..	Paulpietersburg ..	"	B. Gree e ..	Mai sfield
		"	P. Allen ..	Welverdiend
		"	J. B. Rudolph ..	Bosch Krans
		"	R. Craig ..	Frischgewagd
		"	Wm. Craig ..	Elandsberg
R. Wingfield Stratford	Newcastle ..	"	M. Katzenstein ..	Town Lands
		"	Manning & Broods ..	Geelhoutboon
C. E. Walker ..	Portion of Estcourt	Lungsickness	J. H. McDuling ..	Rosedale
		Scab	H. Cadle and others ..	Scotfontein
		"	Alfred Carter ..	Glendoone
		Lungsickness	Chas. B. Lloyd ..	Hitecote
		"	N. C. H. Little ..	Leighton
		"	P. Ballantyne ..	Weston Town Lands

RETURN OF FARMS UNDER LICENCE (*Continued*).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWN. R.	FARM.
G. Daniell	Vryheid	Scab	J. M. Koekemore ..	Hardetaald
		"	E. Mhlalose ..	Metzefonstein
		"	W. Schultz, H. Tsherpia & H. de Lange	Hardbetaal
		"	Swikwana	Nooitkedacht
		"	R. Mavaze	Aanstool
		"	Thomas & Mabawlo	"
		"	J. Swarts	Vaalkrantz
		"	J. J. Odendall ..	Utkomst
		"	M. Kunzwana ..	Vredenhof
J. R. Cooper	Nkandhla & Nqutu	"	S. Mboyi	Mqazini
		"	S. Molife	Haladu
		"	M. Malagwano ..	Blood River
		"	Langa	Batshi
		"	Linjaza	Telezi Hill
		"	L. Molife	"
		"	H. Sutton	Masinkoms
		"	Westbrook Bros. ..	Dawin
		"	L. Msimango ..	Mhilane
		"	Charlie	Masodjeni
		"	C. M. Sekosana ..	"
		"	M. Ndhlovu ..	Dalaza
		"	U. Ndhlovu ..	"
		"	N. C. Kruger ..	Nqutu
		"	L. & J. Mloyi ..	Magala
		"	U. Butelezi ..	Nqutu
		"	L. Mabuya	Maguls
		"	M. Beta	Nqutu Foot
		"	M. Mbata	Telezi Hill
B. Klusener	Port Shepstone ..	"	F. J. Johnston ..	Lot 8, Nqudeni
E. Varty	Western Umvoti ..	"	B. Scott	Murchison
		"	E. Varty	Blackwater
K. Ripley	Emtanjaneni ..	"	Gert van Rooyen ..	Pinedale
		"	Mtshsheweze ..	Protest
J. F. van Rensburg	Ng tshe	"	Bambelela	"
		"	Simon	Smaa'deel
		"	Mitwas	Doornp n
J. Stewart	Bergville	Lung sickness	Umzebelela ..	Berv g.l
E. W. Larkan	Umsinga	Scab	F. R. Stockie ..	K. i. Vlei
		"	Maganglaza ..	Kr. mmedraai
		"	Evans & Stockil ..	Riet Vallei
		"	Amos Nahlovu ..	Nazareth
		"	E. Dubois	Uitval
		"	V. L. Whelan ..	Martin
		"	E. Dubois	Vergelegen
		"	Oyugulangans ..	Umsinga
		"	Gogo	Somshoek
		"	E. C. Nuss	Groo Vlei
		"	Tabatuba	Naza eth
		"	J. H. Nuss	Somerset
		"	J. A. Clements ..	Pumroy
R. Mayne	Eastern Umvoti and Krantzkoop	"	J. We thuyzen ..	"
		"	L. M. J. van Rooyen	S. otdale
		"	P. R. Botha ..	Olivefontein
		"	J. J. van Rooyen ..	Kra tzkop
		"	W. W. Mare ..	Doornhoek
		"	J. L. F. Martens ..	Broe. r's Hoek
		"	P. J. Nel	Ongegund
		"	R. P. Martens ..	Jammerdal
		"	L. J. Nel	Wilgegund
		"	L. L. Nel	Maresdal
		"	J. A. Nel	Welgegund
E. W. Bowles	Ixopo	"	Ngevana	Arundel
		"	Bogwan	"
		"	Genisani	"
		"	Magewana	Klepat
		"	Nodwengw ..	"
		"	Ncupo	"
		"	Vuquza	"
		"	Putaza	"
		"	Nduba	Waverley
		"	Njunga	South Hills
		"	Makafana	Waverley

RETURN OF FARMS UNDER LICENCE (*Continued*).

STOCK INSPECTOR.	DISTRICT	DISEASE.	OWNER.	FARM.
E. W. Bowles ..	Ixopo	Scab	Dumdum	Kolston
		"	Nqaye	Waverley
		"	Umenyana	Kolston
		"	Mancusika	"
		"	Unvakatshe	"
		"	Umbabala	Iprisugval
		"	Kebe	Location No. 6
		"	Luzi	Location
		"	Sibexa	Springvale
		"	Janga	Location No. 6
		"	G. Way	Herdstone
		"	Njoyeta's a	Lot 29
		"	Thelwana	Lot 55
		"	Samtombi	Eme aid
		"	Gungatshi	Location No. 3
		"	G. Thomson	Valahalla
		"	G. H. Cooper	Avetary
A. H. Ball	Weenen	"	D. E. Hardman	Ellington
		"	W. W. Watton	Rocky Halton
A. Hair	City, Umgeni ..	"	Turana	Lot L.H.
		"	Mandemba	Lot D.U.
		"	Tebenga	"
		"	P. Lotter	Berg Vle't
		"	P. H. Van Rooijen	Buffels Hoek
		"	J. Peniston	Town Lands
		"	Umveli	Zwaartkop Location
		"	Dria	"
		"	Samuel	"
		"	Janije	"
		"	Laduma	"

MANGE IN HORSES EXISTS AS UNDER

Owner.	Farm.	District.
Pinda, Vete & Sobuon ..	Strathsoom	Impendhile
Natives	Olivefontein	Umvoti
Natives	Tetworth	Lion's River

Notice.

OWING to the increasing demands upon our space, we have arranged to publish *quarterly* instead of monthly as hitherto certain standing reference matter. This matter will consist of (1) Scale of Charges for Vaccines, etc., at the Government Laboratory; (2) List of East Coast Fever Advisory Committees; (3) List of Executives of Farmers' Associations; and (4) List of Publications issued by the Department of Agriculture. In future readers will find this matter in the January, April, July and October issues of the *Journal*.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 8TH APRIL.

Donnybrook—Running on the farm “Lefia,” Ixopo, and reported by E. G. Collis to be too wild to be driven to the Pound : Brown filly, two hind feet white, white streak on nose, no brand ; apparent age, 2 years.

Mooi River—White she goat, piece off right ear, no brands.

Umsinga—Running on A. Bates’ farm, Balgownie, and reported to be too wild to be driven to the Pound : Chestnut gelding, long tail, aged 2 years.

ON THE 9TH APRIL.

Donnybrook—Two goats (rams), one black and white, one yellow.

Vrgheid—Small dark he donkey, nick cut out of top of both ears, and left ear cut down side. Probable value, £3.

ON THE 15TH APRIL.

Greytown—Reported by Chief Tunizwe, residing close to the Pakade, as too wild to be driven to the Pound : Two black she goats ; two white she goats ; one wether goat.

Ngutu—Three Kafir sheep, 2 ewes 1 lamb, white, and several clips out of ears. Lamb since dead.

POUND ABOLISHED.

In terms of the provisions of the Pound Act, 1898, the Pound at Hilton Road, Umgeni Division, will be abolished, with effect from 31st March, 1909.

According to the *Sydney Stock and Stationery Journal*, Mr. P. W. Jenkins, of Clifton, Nimity-belle, New South Wales, has discovered a frost-proof potato. Mr. Jenkins, who has been experimenting for years to get a potato that would stand the severe frost of the Monaro district, three years ago hit upon the one under notice. For a start, only one potato was used, and this was cut into thirteen sets, leaving only one eye for each set. The season was an exceptionally bad one, but nevertheless a yield of a kerosene tin full was obtained. From this lot, with another bad season to contend against, four tons were dug. “The samples we have seen,” the *Journal* continues, “are very fine, and one great point is that these potatoes are much earlier than any other variety, and their first-resistant properties are simply phenomenal. They have been cut down thirteen times, and then gave a wonderful yield. No matter how the frost may affect the tops, there is positively no evidence of its ravages underground. The new potato is a tip-top boiler, thin-skinned, and a good saver. It is not waxy, but a true floury potato. Mr. Jenkins is hopeful that his frost-proof product will push ahead the potato-growing industry. In addition to its immunity from frost-bite, it is so early that it would be possible in the most favoured districts to take out three crops a year. Mr. Jenkins has already sold some of the seed-potatoes at 12s. 6d. per lb.”

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

	Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
			Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300 lbs. weight.	Over 300 lbs. weight.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1. Receiving per head	0 3	0 6	0 6	0 6	0 3	0 3
2. Killing and Cleaning	2 3	3 6	2 9	3 3	2 6	3 0
3. Labour	0 3	0 6	0 3	0 6	0 3	0 6
4. Disinfectants	0 1	0 1	0 1	0 1	0 1	0 1
5. Bagging (4 Quarters) per body	1 9	3 0	2 6	2 9	2 3	2 6
6. Cleaning of Tripes each	0 6	0 6	0 6	0 6	0 6	0 6
7. Chilling of Beef, up to 72 hours or portion thereof per body	1 0	2 9	2 0	2 6	1 9	2 6
8. Chilling of Offal, up to 72 hours or portion thereof per set	1 0	1 0	1 0	1 0	1 0	1 0
Chilling and Freezing Beef—						
9. 1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10. 2nd " " " " "	1 0	4 0	3 3	3 6	3 3	3 3
11. 3rd and remaining weeks or portions thereof	0 8	3 0	3 0	3 0	3 0	3 0
Chilling and Freezing Offal—						
12. 1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13. 2nd " " " " "	1 0	1 3	1 0	1 0	1 0	1 0
14. 3rd and remaining weeks or portions thereof	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars, apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

Agricultural and Other Shows, 1909.

DUNDEE (Dundee Agricultural Society).—Show, 10th and 11th June. J. McKenzie, Box 105, Dundee, *Secretary*.

GREYTOWN (Umvoti Agricultural Society).—Date not fixed. W. H. Gibbs, Box 24, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Date not fixed. E. V. Bambrick, Box 90, Ladysmith, *Secretary*.

NEW GERMANY (Durban County Farmers' Association).—No separate show contemplated; but it is intended to join the Durban and Coast Society for the purpose of making complete exhibit of Durban products.

PIETERMARITZBURG (Royal Agricultural Society).—Show, 17th, 18th and 19th June. Duff, Eadie & Co., *Secretaries*.

PIETERMARITZBURG (Natal Poultry Club).—Show, 17th & 18th June. A. J. Peters, Box 197, *Secretary*.

UMZINTO (Alexandra Agricultural and Horticultural Association).—Show, 8th July. George Lamb, Box 68, Umzinto, *Secretary*.

CAMPERDOWN (Camperdown Agricultural Society).—Show, 23rd July. Messrs. Walker & Burchell, Camperdown, *Secretaries*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—7th, 8th and 9th July. J. Morley, 399, Smith Street, Durban, *Secretary*.

DURBAN (Durban and Coast Poultry Club).—Show, 14th, 15th and 16th July. H. M. Fletcher, 26, Castle Arcade, Durban, *Secretary*.

HARDING (Alfred County Farmers' Association and Agricultural Society).—Show, 23rd June. H. C. Hitchins, "Hluku," Harding, *Secretary*.

NEW HANOVER (New Hanover Agricultural Association).—Show, 30th July. W. D. Stewart, New Hanover, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Byrne Farmers' Association; Eshowe District Farmers' Association; Richmond Road Farmers' Association; Donnybrook Farmers' Association; Ladysmith Farmers' Association; Hatting Spruit Farmers' Association; Boston Farmers' Association; Little Tugela Farmers' Association; Umvoti Farmers' Association; Highflats Farmers' Club; Vryheid Agricultural Society; Garden Castle Farmers' Association; Nottingham Road Farmers' Association; Seven Oaks Farmers' Association; Richmond Agricultural Society; Slangrivier Boere Vereeniging.

OTHER SOUTH AFRICAN SHOWS.

The following dates have been fixed for Agricultural Shows in other parts of South Africa outside of Natal:—

Cape Colony.—Oudtshoorn, 7th & 8th April.

Orange River Colony.—Heilbron, 31st March & 1st April.

Transvaal.—Barberton, in July; Heidelberg, 7th April; Marico, date not yet fixed; Pretoria, 1st, 2nd & 3rd April; Witwatersrand, at Johannesburg, 14th, 15th, 16th & 17th April; Wolmaranstad, 5th May.

Farm Apprentices' Bureau.

LIST OF APPLICANTS.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

- | | | |
|-----|-----|---|
| No. | 1. | (Applicant already placed with farmer.) |
| " | 2. | Age 15 years. Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch. |
| " | 3. | Age 24 years. Colonial born. Has knowledge of bookkeeping. |
| " | 4. | Age 18. Natal born. Anxious to learn. |
| " | 5. | Age 24. Speaks Zulu. |
| " | 6. | Age 17. Is still at school. Speaks French fluently, and has a fair knowledge of German and Dutch. Is very well educated. Particularly anxious to learn farming. |
| " | 7. | Age 15. Is keenly interested in farming. |
| " | 8. | Age 13. Natal born. Anxious to learn. |
| " | 9. | Age 17. Speaks Zulu and Dutch. Is particularly anxious to learn farming. |
| " | 10. | Age 15. Speaks Zulu and Dutch. Is particularly anxious to get on a farm up-country. |
| " | 11. | Age 18. Has had two years' experience on a sheep farm in the Orange River Colony. Is particularly anxious to get back on a farm. |
| " | 12. | Age 17. Natalian. |
| " | 13. | Age 20. Is an orphan. Is anxious to learn farming. |
| " | 14. | Age 16. Natal born. |
| " | 15. | Age 19. Is desirous of learning farming. |
| " | 16. | Age 21. Has had some experience on a mixed farm at Besters. Speaks Zulu. Is keenly interested in farming. |
| " | 17. | Age 20. Speaks Zulu. Is keenly interested in farming. |
| " | 18. | Age 21. Speaks Zulu. Is keenly interested in farming. |
| " | 19. | Age 17. Speaks Dutch. Is keenly interested in farming. |
| " | 20. | Age 18. Is an orphan. Is anxious to learn farming. |
| " | 21. | Age 21. Speaks a little Dutch and Zulu. Is a good mechanic. |
| " | 22. | Age 16. Good references. |

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the fund, Colonial Offices, Pietermaritzburg.

All correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 337, Pietermaritzburg.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 111.—Married man, 36, no children, desires managership of farm. Spent five years with Capt. Hayes, and is well acquainted with the management of horses, including racing horses. States he has sound veterinary knowledge and understands dairy, poultry, pig, and stock farming generally. South African experience, four years Cape Colony and one year Impendhle Division, Natal. Is prepared to work for month or two for board and lodging to prove capabilities, provided sound opening at end of that time.

No. 113.—Age 27, desires to obtain a start on a farm in Natal. Came to South Africa six months ago; attended the preliminary classes at the Glasgow and West of Scotland Agricultural College, and has also obtained a certificate for Theoretical Agricultural Chemistry. Is steady, and would be willing to work without any salary in order to obtain a practical knowledge of farming.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Division of Agriculture and Forestry Notices.

FEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experimental Farm, Cedara, in accordance with the following scale of fees, which is subject to revision :—

FERTILISERS AND FEEDING STUFFS :				Scale I.	Scale II.
				£ s. d.	£ s. d.
Determination of 1 constituent	...	...	...	0 7 6	0 5 0
Determination of 2 or 3 constituents	...	...	...	0 15 0	0 10 0
Complete analysis	...	...	...	1 1 0	0 15 0
SOILS : Partial analysis of a soil in relation to its fertility				1 1 0	0 10 6
Complete analysis of a soil	...	...	...	2 2 0	1 1 0
WATER : Irrigation and drainage				1 10 0	0 10 6
VEGETABLE PRODUCE : Fodder, Ensilage, Grain, &c.				1 10 0	0 15 0
MILK, CREAM, BUTTER : Fat only				0 5 0	0 2 6
" " : Complete				0 15 0	0 7 6
WATTLE BARK AND TEA : Tannin				0 5 0	0 2 6
CATTLE DIPS : Quantitative analysis of 1 to 3 principle constituents				0 10 0	0 5 0
INSECTICIDES :					
Qualitative analysis each constituent				0 5 0	0 2 6
Qualitative " " "				0 10 3	0 5 0

Scale No. 1 is applicable to samples handed in by merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Director, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Director to remit any charges hereunder.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for Sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

TENDERS FOR MONO-RAIL SYSTEM.

Tenders are invited for the purchase of 6,400 feet of mono-rails, with points, etc., and four sugar cane trucks, from the Central Experiment Farm.

Tenders should be addressed to the Director, Cedara, and should be submitted with the least possible delay.

MAIZE SEED.

Growers who may have for sale selected seed of the following types of maize are invited to communicate as early as possible with the Director, Cedara :—Horse Tooth, Hickory King, Boone County, Golden King and Yellow Dent.

POULTRY.

Orders will be received for selected cockerels of the following breeds for immediate delivery :—Buff Orpingtons, White Minorcas, Silver Wyandottes and Plymouth Rocks,

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

DEVON BULLS.

Offers are invited for three young South Down bulls, by imported bull, "Star of the West." Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.

Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.

Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.

Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.

Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.

Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.

Agricultural Seeds, etc., for Irrigation Farming.—Curator, Government Station, Weenen.

Fruit.—Orchardist, Cedara.

Accounting Business.—Accounting Clerk, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry,
Cedara.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

SOUTH AFRICAN STUD BOOK.

A record of all classes of Stock; the object being to encourage the breeding of thoroughbred stock and to maintain the purity of breeds, thus enhancing their value to the individual owner, and to the country generally.

Application for Membership and Entries of Stock should be addressed:—

For CAPE COLONY ..	..	A. A. PERSSE, P.O. Box 703, Cape Town.
„ TRANSVAAL	F. T. NICHOLSON, P.O. Box 134, Pretoria.
„ ORANGE RIVER COLONY	E. J. MACMILLAN, Government Buildings, Bloemfontein.

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IS OBTAINABLE OF:—

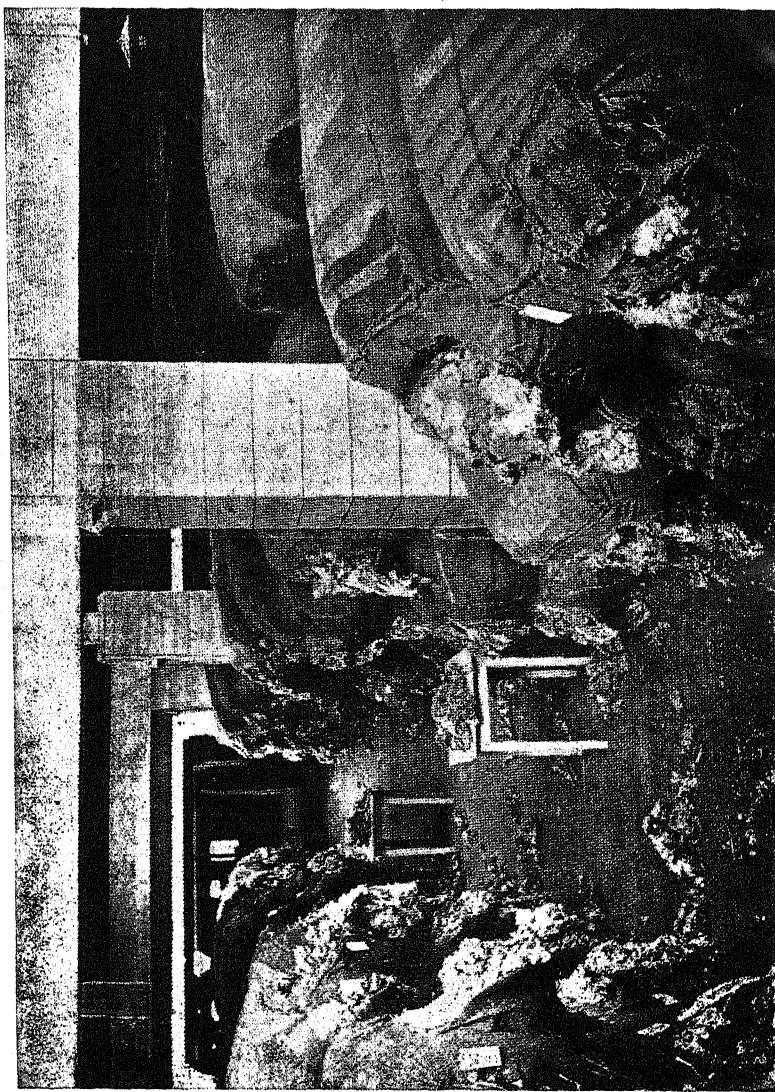
T. MASKEW MILLER,

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A. A. PERSSE,

SECRETARY, SOUTH AFRICAN STUD BOOK ASSOCIATION.



SOUTH AFRICAN WOOL AT AMSTERDAM.

Stored in one of the "Vriesseveen" Warehouses.

(From "South African Products for North and Central Europe.")

The Natal Agricultural Journal.

A Neglected Factor in Maize Production.

THE main mealie crop of the Colony is now rapidly nearing harvest-time. The prospects of the crop, so far as we have information, continue more or less favourable, and we are likely to have a good harvest. A special article on this subject will be found, as usual, as a "sub-leader" in the present issue, wherein will be found the latest available complete information regarding the crop, the probable yield, and the average condition of the crop in each of the Magisterial Divisions of the Colony on the 31st March. In the present article we are concerned with another and a very important matter which requires the careful attention of every farmer who makes mealie-growing a more or less important part of his business. We are building up an export trade in mealies as one of the largest, perhaps, farm industries of the future; we are gradually increasing our total acreage; we are manuring our lands as far as we can in order to increase their producing power. So far we are doing well, and our total crop is increasing year by year. But are we not overlooking an important factor, the neglecting to consider which is preventing us from making as good use of our lands as we might do?

Upon what main factors does the production of a good crop depend—leaving out of consideration such incidental adverse influences as insect ravages and unfavourable weather conditions? To this question nine farmers out of ten would, without hesitation, reply that the yield depends upon the productivity of the soil; and perhaps two or three out of the nine would add that the yield can be further increased by frequent tillage. And that would probably be all that we should learn. But there is another factor; and it is to this factor that we desire to draw attention

this month, in order to show its importance and the loss which its neglect is annually involving. Every farmer knows what a poor stand of mealies is—no farmer needs to be told that the stand varies: sometimes it is good, sometimes bad; on some fields it is practically all that could reasonably be desired, on others the stand is wretched. Every farmer knows this, yet it is a factor in mealie production that, we might say, nine farmers out of ten pay no particular heed to, except to grumble at when its effects are seen on their own fields. They certainly include it in their estimate of their yield per acre. Four muids per acre, a farmer may tell you, will be his probable yield; and in making this estimate he includes the pooriness of the stand with all the other adverse factors, and there the matter ends. Few take proper steps, however, towards remedying the fault. "The stand is poor, and that's all about it. How can I help it?" a farmer will say.

Let us see, by actual figures, what this neglect means.

As will be seen, in our article on the subject, we estimate that the prospects on the 31st March were for a total European crop of about 770,000 muids. Now we can be practically certain that quite 20 per cent. of the seed planted at the beginning of the season failed to germinate, so that we have at present a stand of 80 per cent., whereas it ought to be quite 95 per cent. Thus we lose 15 per cent.: our crop is 15 per cent. less than it ought properly to have been. Fifteen per cent. on 770,000 muids is, roughly, 914,000 muids: so that, had we a stand of 95 per cent. we should now be anticipating a crop 144,000 muids greater than it actually is. This deficiency of 144,000 muids is equivalent to 60,000 quarters; and taking the average price which our mealies will realise in London as, roughly, 25s. a quarter, we find that we are losing a little over £75,000.

These figures will serve to show the importance of this neglected factor of non-germination of seed. We have taken a probable crop of 770,000 muids and a probable price of 25s. a quarter; for the probable extent of the loss by reason of the failure of the seed to germinate—about 20 per cent.—we are indebted to an American authority (United States Department of Agriculture: Farmers' Bulletin No. 253). As a matter of fact, our American authority refers to a stand of from 60 to 85, so that, in calculating upon a stand of about 80 per cent., we have in reality taken a high figure. The results of the calculations point to this: That the farmers must pay greater attention to seed selection, and so endeavour to increase their crops. Manures have their part to play: they will make the land itself more productive; but manures cannot give us a good stand—they will make healthy, strong plants, that will give good yields, but they will only benefit the plants that come up. You provide the plants, and the manure will make them produce large crops.

But how are you going to provide the maximum number of plants?

You may plant 10,000 seeds, and perhaps 8,000 of them, or 80 per cent. only, will come up. A certain percentage of those which failed to come up—perhaps 25 per cent. or 500 seeds—failed from causes over which you had no control; but what of the remaining 1,500 which did not send up shoots? Could you not have taken some steps, before planting, to ascertain about how much of your seed would germinate?

Such an estimate can be made. Representative samples of seed can be taken and tested, and from the results obtained the farmer can select his seed for sowing and be certain of a stand of 90 or even 95 per cent. This means that he gets practically the best results from his land with the minimum quantity of seed. The value of a test, and an idea of the plan to follow in making such a test, are shown in the following, which we quote from the Bulletin already referred to:—

It is now almost universally admitted by those who have become interested in the vitality of seed corn [*i.e.*, mealies] that the testing of each ear [cob] separately is most highly profitable. Experiments have shown that if a few kernels (preferably six) are taken from different parts of an ear of corn and all are found to germinate well—that is, to produce *good healthy sprouts*—practically all of the kernels on that ear will likewise show strong vitality. On the other hand, if a part or all of the kernels tested fail to germinate or show only weak sprouts, the proportion will be the same for all of the kernels on such ears.

The testing of a hundred or more kernels from the entire lot of seed which has been shelled for planting does not meet the requirements, save, perhaps, in a few very special cases.

The time and labour involved in testing the seed is small in proportion to the gain. The method is simple, and can be followed by any farmer. In our next issue we propose publishing an article on the testing of the germinating powers of seed mealies, when we shall give full instructions regarding the best methods, to guide our readers.

In this issue our purpose has been to draw attention to the desirability of testing seed mealies before planting and to the loss which is annually occurring to the country through neglect to pay proper attention to this important matter; the actual methods of testing we will discuss next month

Don't think that a pig eats merely to live.

Remember that the cow is not a racehorse and should not be a plaything for a trained dog.

The Maize Crop in March.

THE average condition of the maize crop throughout the Colony was again slightly lowered during the month of March. On the 31st January, it may be remembered, the condition was 3·1, or very slightly above the average of the preceding five years. This gave a yield of 5·34 muids to the acre—or a total crop of 886,000 muids. In our last issue we announced that the condition of the crop was 3·0—or an average crop on the basis of the preceding five years. This gave us a yield of 5·16 muids per acre, or a total crop of about 856,000 muids. We now find that the average condition of the crop on the 31st March was 2·69—or between “fair” and “average.” This means a yield of 4·63 muids to the acre, or a total crop of about 770,000 muids.

It will be interesting here to set forth the average condition of the crop, the yield per acre that condition represents, and the total crop promised thereby, at the end of each of the months, December, January, February and March:—

At End of—		Condition.	Yield per acre. Muids.	Probable total crop. Muids.
December	...	2·7	4·7	780,000
January	...	3·1	5·34	886,000
February	...	3·0	5·16	856,000
March	...	2·69	4·63	770,000

The reduction in the condition of the crop has, of course, chiefly been due to excessive rains. Since the end of March we have had considerably better weather, and we may expect to find, from our reports for the end of April, that the condition of the crop has improved again.

Using the figures 1, 2, 3 and 4 to represent the conditions “Poor,” “Fair,” “Average” and “Above the Average,” we have prepared the following comparative statement, which will doubtless prove of interest to the reader, as showing the progress or otherwise the crop is making in each of the Magisterial Divisions of the Colony. A little explanation of our method may make the statement clear. The condition represented by the figures 2·7 will serve as an example. The figure “2,” it will be remembered, represents the condition described as “Fair,” whilst “3” represents “Average” condition. Thus 2·7 will represent an *average* condition of from “Fair” to “Average,” but a little nearer “Average” than “Fair.” This does not mean, of course, that all the crops in that Division may be described as 2·7 in condition. In fact, it may easily be that not a single field is of such condition. The meaning is that, taking the crops as a *whole*, their condition is something a little more than midway between “fair” and “average.”

CONDITION OF CROP.

(Note.—A condition “above the average” is represented by the figure 4; “average” by the figure 3; “fair” by the figure 2; and “poor” by the figure 1: intermediate figures represent corresponding conditions.)

Division.	Condition of Crop at End of—			
	December.	January.	February.	March.
Lower Umzimkulu	2·7	3·0	2·7	2·5
Alexandra	2·5	4·0	4·0	3·0
Umlazi	3·0	3·0	3·0	2·5
Inanda and Indwedwe	3·0	4·0	3·0	2·0
Lower Tugela and Mapumulo	2·0	4·0	3·0	2·0
Impendhle	3·0	3·0	3·0	3·0
Alfre	3·0	4·0	3·4	4·0
Ixopo	2·4	4·25	3·5	3·0
Richmond	2·5	3·0	3·0	2·5
Umgeni	3·0	3·5	4·0	3·2
New Hanover	2·0	2·75	2·4	3·0
Lion's River	3·0	3·0	2·5	3·0
Umvoti	3·7	3·2	3·2	3·5
Krantzkop	3·0	2·0	4·0	3·0
Underberg	4·0	3·0	2·4	2·5
Polela	3·0	4·0	4·0	4·0
Bergville	3·0	2·7	2·0	2·4
Estcour	2·7	2·9	2·5	2·0
Weenen	3·0	2·0	2·0	2·0
Klip River	2·8	2·6	2·75	2·4
Umsinga	2·0	2·5	3·0	2·5
Dundee	2·0	1·7	2·0	2·0
Newcastle	3·0	2·9	2·8	2·3
Vryheid and Ngotshe	2·5	2·0	3·0	1·0
Utrecht	—	4·0	3·0	2·0
Babanango	—	—	—	2·0
Eshowe and Mtunzini	3·0	2·5	3·0	4·0
Emtonjaneni	2·0	3·4	3·4	3·0

The figures in this statement show how the crop has been faring, month by month, in the different Magisterial Divisions. It may be of interest also to note that the average condition of the crop on the Coast belt at the end of March was 2·6, in the Midland belt 3·1, and in the Upland belt 2·2. The corresponding figures for the end of February were: Coast, 3·5; Midlands, 3·3; Uplands, 2·6.

It frequently happens that a horse has more sense than the driver.



To Our Readers.

THE Annual Conference of the Natal Agricultural Union has been the great event of the month. The proceedings were opened on the morning of Wednesday, 21st April, and terminated at half-past three on the afternoon of Friday, the 23rd. A large amount of business was got through and some interesting discussions took place. In this issue we publish as large a portion as we can of our report of the proceedings, and the remainder we shall give in our next issue. We should have liked to have published the entire report in the present issue, but this was impossible owing to other demands upon our space—such as, for example, Mr. Pitchford's instructive report on dips and dipping, which we print in its entirety. Owing to the importance of these annual gatherings of farmers and the widespread interest which the publication of full reports of the proceedings creates, we have felt it our duty to devote as much space as we could possibly spare to a report of the proceedings, and we crave the indulgence of our readers if the rest of the matter in this issue of the *Journal* is not as varied in its nature as it generally is.

We have, as a consequence, been obliged to hold over the second instalment of our article on the results of recent Live Stock Feeding Experiments as well as the second instalment of our article on India-Rubber Cultivation. We have also been compelled to omit a considerable amount of interesting matter which has come to hand during the past month, but which we hope to publish in our next issue. Among this matter there will be an article which we are compiling based upon the results of enquiries made by the Commercial Agent for Natal in London (Mr. Harrison) of leading wool brokers with a view to the improvement of the Natal wool clip. In this article we shall publish some very interesting views and valuable hints which should do much to improve the standard of our wool. Another article will deal with the possibilities of bamboo cultivation for the supply of pulp for paper manu-

facture. This is a very interesting practical question, and the publication of the information which Mr. Harrison has collected in this regard may prove the first step towards the foundation of another important industry for the Coast.

We wish to take this opportunity of thanking the President (Mr. E. W. Evans) of the Natal Agricultural Union for his kind words of praise, expressed in the concluding paragraph or two of his Annual Address to the Conference, for the *Natal Agricultural Journal*. We are doing our best to make the *Journal* a real, live Farmers' Journal, and are sparing no efforts to secure the best and most practical information for the attainment of that end. We want to make the *Journal* a complete journal for the Natal farmer: it is our object to publish all the original matter that the limited time of the experts of the Department of Agriculture will allow them to prepare, to keep readers up to date in all the latest doings of interest in the agricultural world and all the latest results of practical importance attained by the scientists, to suggest new crops of possible value to the Natal farmer and draw attention to new methods of cultivation, to endeavour to keep farmers' associations informed of each others' doings and so gradually provide a bond of sympathy between all Natal farmers, and to provide a medium for the expression of the views of our farmers. These are some of our objects. We want to help the farmer in every possible way; and to do this it is our continual endeavour to make the *Journal* a complete, up-to-date farmers' journal. We may take this opportunity to say that we shall at all times be glad of any assistance from our readers in the way of articles, notes, letters, etc. We have received many letters of appreciation and encouragement lately, and we would here thank all those who have so kindly expressed themselves in sympathy with our efforts.

Earth-Nut Machinery.

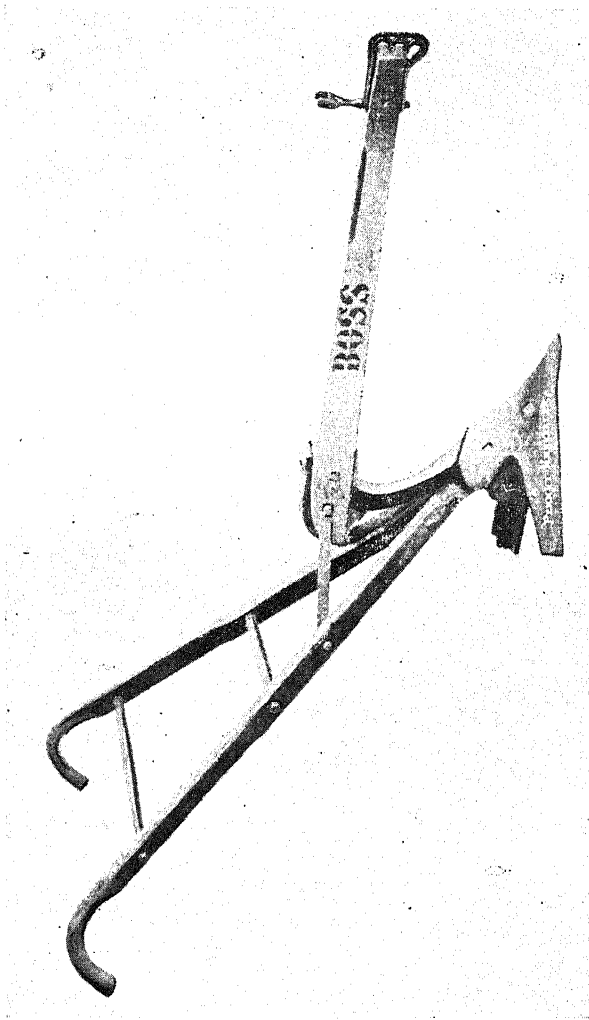
In this issue we are enabled, through the courtesy of Messrs. Malcomess & Co., Ltd., Durban, to publish a photograph of an earth-nut (pea-nut) digger which should prove of interest to a considerable section of our readers. We made enquiries regarding earth-nut diggers in response to a request for information from one of our readers; and Messrs. Malcomess & Co. have kindly furnished us with information not only concerning the digger we illustrate but also regarding a more elaborate machine, of which, unfortunately, we have no illustration suitable for reproduction.

The digger illustrated is, as will be seen, a small plough specially designed for harvesting operations. Writing with reference to this im-

plement, the manufacturers state: "For harvesting pea-nuts, they use what is termed a pea-nut point or share, as shown in photo. The regular point and mouldboard used in the cultivation of pea-nuts is removed, and the pea-nut point put on. This is long and narrow. The idea is to run the long point under the pea, and cut what is known as the tap-root, and then the tine is easily lifted from the ground with the peas hanging on. You give them a shake and the dirt drops off."

The more elaborate digger, of which Messrs. Malcomess & Co. have sent us particulars (the O.K. Champion Pea-nut Digger), is even more a labour-saving device. At the front of the digger is a shovel which is run in beneath the row and raises the ground and nuts, which are then deposited on specially constructed carriers. These break up the ground, loosening the nuts so that they are easily extracted; the carriers convey the vines and nuts up over the machine, while the dirt loosens itself through the links of the carriers, and leaves the ground in a level condition for the vines and nuts to be deposited on by a shaking fork rower. This latter contrivance not only deposits the vines and nuts, but by its vigorous vibration it cleans any remaining dirt from the nuts and leaves them clean in a row behind the machine in good shape for gathering and stacking. A vine cutter is also manufactured, which is bolted to the front truck wheels. It consists of a specially stamped crucible coultter steel disc with keen edge, with a protecting guard covering the upper and front side of the blade. This is an essential feature when digging the running vine variety of nuts. The whole machine is light of draught, being easy work for two horses. It has but two gear wheels to drive the entire working parts. The price of this machine is \$50 at the factory, to which Messrs. Malcomess & Co. would, of course, have to add their importing charges, making the price of the machine in Natal about £11.

Another machine of interest to which we may draw attention whilst we are discussing earth-nut implements, is the O.K. Champion Peanut Planter. This machine will plant shelled and unshelled nuts by inter-changing feed cups. It has a wide shoe that levels the ground 12 inches wide to the row; under and to the rear of this shoe is a keel which opens the trench for the reception of the seed. The seed is dropped into this trench by the cups through the spout. Two scrapers follow immediately after the feed spout, covering the seed with loose ground. Then comes the concave pressure wheel which presses the ground firmly on the nuts and leaves a well-rounded ridge over the row of seed. The dropping device is an endless chain of cups, just large enough for one nut to drop into. The factory price of this machine is \$16-00 (about £3 6s.).



EARTH NUT HARVESTER.

(From photo, kindly supplied by Messrs. Malcomess & Co., Ltd., Durban.)
See "Notes and Comments."

Cantor Lectures on the Meat Industry.

Mr. Loudon M. Douglas, who is Professor of the Meat Industry, and who successfully conducted a course of instruction during the past winter at the College of Agriculture, Edinburgh, has been appointed to give a series of lectures at the Royal Society of Arts, London, during next winter, on the subject of the Meat Industry. The lectures will be given under the Cantor Scheme and will be open to all who are interested in this subject, and it will be the endeavour of the lecturer to demonstrate the enormous developments which have taken place in the Meat Industry during recent years, and also to show the necessity for academic training at our Colleges and Universities, in connection with the handling of Great Britain's principal food supply.

Challenge Cup for Merino Rams.

We are informed by Mr. A. A. Persse, the secretary of the Western Province Agricultural Society, Cape Town, that in connection with the 1909 Rosebank Show, a special challenge cup, value £50, for Merino rams, was kindly offered for competition by the executors of the late Mr. Alfred Beit. The conditions were that rams entered for the prize had to be brought to the 1908 show and be there shorn bare. The rams had to be run under natural conditions for 12 months; to be again shorn bare at the 1909 show; the fleeces then to be hot-water scoured, weighed and valued, the cup being awarded for the ram giving the greatest monetary value of scoured wool. Mr. R. Starke, of Oatlands, Durbanville, kindly placed his farm at the disposal of the society, so that the rams could be kept under precisely similar conditions. There were eight entries for the prize, but unfortunately one of the rams died during the period of the test. The remaining seven were brought to the 1909 show in excellent condition. On shearing the rams, the following results were obtained, the fleeces being submitted to three of the leading wool merchants of Cape Town, so as arrive at a fair estimate of the value (the owner's name in each case is shown in brackets, the "weight" is the weight of the fleece in grease, and the "value" is the value per pound in grease):—Exhibit No. 276 (J. H. King): weight $24\frac{1}{2}$ lbs.; value, 6d. per lb. Exhibit No. 277 (F. C. Bayly): weight, 35 lbs.; value, $3\frac{3}{4}$ d. per lb. Exhibit No. 278 (C. Adams & Son): weight, $21\frac{3}{4}$ lbs.; value, $4\frac{1}{2}$ d. per lb. Exhibit No. 279 (G. King & Sons): weight, 20 lbs.; value, $7\frac{1}{2}$ d. per lb. Exhibit No. 280 (A. H. Frost): weight, $30\frac{1}{2}$ lbs.; value, 5d. per lb. Exhibit No. 281 (J. G. Sieberhagen): weight, $28\frac{3}{4}$ lbs.; value, $6\frac{1}{2}$ d. per lb. Exhibit No. 282 (J. G. Sieberhagen): weight, $24\frac{3}{4}$ lbs.; value, $4\frac{1}{2}$ d. per lb. The fleeces, after being hot-water scoured, gave the following results (the "weight" in this case is, of course, the weight of the scoured wool):—Exhibit No. 276 (J. H. King): weight, 8 lbs. 10 ozs.; value per lb., 1s. $4\frac{3}{4}$ d.; total

value, 12s. 0½d. No. 277 (F. C. Bayly): weight 8 lbs. 9 ozs.; value per lb., 1s. 2½d.; total value, 10s. 4d. No. 278 (C. Adams & Son): weight, 7 lbs. 9 ozs.; value per lb., 1s. 4d.; total value, 10s. 1d. No. 279 (G. King & Sons): weight, 7 lbs. 2 ozs.; value per lb., 1s. 6d.; total value, 10s. 8d. No. 280 (A. H. Frost): weight, 8 lbs. 15 ozs.; value per lb., 1s. 4d.; total value, 11s. 11d. No. 281 (J. G. Sieberhagen): weight, 10 lbs. 6 ozs.; value per lb., 1s. 5d.; total value, 14s. 8d. No. 282 (J. G. Sieberhagen): weight, 7 lbs. 6 ozs.; value per lb., 1s. 5½d.; total value, 10s. 9d.

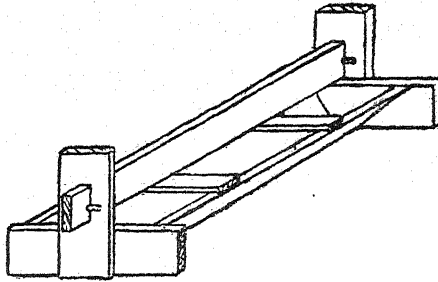
It will thus be seen that exhibit No. 281, the property of Mr. J. G. Sieberhagen, came out an easy winner, though the quality of exhibit No. 279 was more favoured by the judges; but this fleece, being much lighter, bore no comparison when monetary value was taken into account. It may be mentioned that all the fleeces were somewhat burry, owing to the nature of the veldt on which the sheep had run, but this was not taken into consideration by the judges when estimating the value. The loss in scouring will no doubt come as a surprise to many breeders, ranging as it did from about 65 per cent. to 75 per cent. The test proved a very interesting and instructive one, and it is hoped that funds will admit of its being repeated in future years.

Agricultural Machinery.

We are very glad to notice the successes which have been achieved by Messrs. G. North & Son, the well-known firm of machinery merchants, at every show this year in the Orange River Colony and the Transvaal. It is not our custom thus to refer to the successes of individual firms, but we cannot help commenting upon the marked success this firm has had this year. At Johannesburg, Volksrust, Bethlehem, Harrismith, Heilbron and Kokstad they were awarded first prize for "Best Collection of Agricultural Implements and Machinery," in addition to twenty first prizes, a silver cup (value ten guineas) and four second prizes for various agricultural machinery and implements at Johannesburg. At Pretoria this firm was again eminently successful, obtaining eight first, one special, one second, and the gold medal for most points in the agricultural implement and machinery section. For ploughs especially Messrs. G. North & Son have secured a large number of awards, both at shows and at public ploughing contests. We are glad to see such successes on the part of Natal machinery merchants. The obvious conclusion is that we have in Natal good, enterprising firms, who must play their part in the agricultural progress of the Colony, for without machinery—and good machinery—the farmer must necessarily be handicapped in his competition with his oversea brethren.

A Cheap Pig Trough.

The pig trough shown in the illustration has been used by a correspondent of the *Agricultural Gazette* (London) for several years, and is the best he has ever used. He states that the idea is to allow pigs to eat from both sides of the trough without fighting. The top bar is mortised through the end pieces, and held in place with pin on either



side of the uprights. This allows the bar to be removed, if necessary, and is also a quick and sure manner of holding the bar in place. For a 4 to 6-ft. trough this bar may be made of 6-in. fence board, but for longer troughs it should be made of a 2 in. by 6 in. or 2 in. by 8 in. timber. The trough is made in the usual manner, with strips nailed across the top if desired. A 1-in. hole is bored in one end of each trough, and a wooden plug driven in, in order to facilitate cleaning. Many think it unnecessary to clean a pig trough, but sickness might be prevented if this matter received more attention.

Potato Diseases.

In the present issue we publish an article by Mr. Albert Kelly on Some Diseases of the Potato Crop in Natal. The publication of this article is not intended to indicate that the potato diseases enumerated therein are rampant in this Colony. With the exception of the Potato Blight (*Alternaria solani*), our potato crops are remarkably free from disease in general, and where one or the other of the remaining fungus diseases may on occasion become particularly noticeable it is always due to unusual climatic conditions, or at most to the planting of unsound seed. So far as Murrain is concerned there is little doubt that the spasmodic outbreaks which have occurred from time to time during the last ten years are directly traceable to seed infection. Such seed is always imported, and in practice it is not possible to detect the infection. It was stated by a Transvaal delegate at the Bloemfontein Conference of the Inter-Colonial Agricultural Union that White Rot was spreading in Natal, but there is absolutely no foundation for this statement nor any reliable evidence to support it.

Cotton-Baling Methods.

In this issue will be found two interesting illustrations showing cotton-baling methods, which we have taken over from the *African World* for February 6th. The photos. were taken recently at the docks of the Manchester Ship Canal Co., and are of particular interest in view of the fact that the Egyptian method of baling cotton is to be adopted in America in future. The pictures show cotton from Egypt nicely baled and offering a distinctly more marketable appearance than the American product.

A Visit to Winkel Spruit.

We have received from Mr. W. Mapstone, of Preston Park, some notes on a visit to the Winkel Spruit Experiment Farm which we think will prove interesting to other readers of the *Journal*. Mr. Mapstone writes:—I recently spent a very interesting visit at the Winkel Spruit Experimental Farm. Mr. Johansen, the farm manager, and Mrs. Johansen were both extremely hospitable. I noticed that the mealies were very fair, and, although they were not yet harvested, it is very likely the average yield will be from 11 to 12 muids per acre. The variety of mealie which attracted me most was the Boon County. The stalks were smaller and the cobs larger than those generally grown in this locality. Although I did not see any "Hickory King," I believe they would do very well if they were given a trial. A large quantity of monkey nuts had just been harvested, which gave the excellent yield of a little over 3,000 lbs. per acre. The next thing of interest was a plot of velvet beans, which, I think, were the finest I had ever seen. The Indigo shrubs looked very promising, and some trees which were planted a little more than a year were at least 6 feet high and would possibly give 1 lb. of seed per shrub. I am informed that Natal Indigo seed is now fetching 2s. 6d. per lb. on the market. Should this be correct, as the trees need only be planted about 5 feet apart, there is little doubt that the cultivation of this plant would be a paying investment.

There are several varieties of fibre aloes cultivated, all of which looked very promising; but I am afraid as they grow taller the wind will become a source of danger, notwithstanding the fact that they are protected by gigantic sugar-cane "break-winds." On going through the orchards, I found that almost everything was looking at its best and doing the manager great credit. Perhaps the excellent "Navel Washington" oranges and pineapples would arrest one's attention more than anything. The next thing which attracted my attention was the fields of cane, the density and height of which were very noticeable after the "scraggy" stunted stuff usually produced in the "midlands." As the land now producing this cane was only recently claimed from the bush, the

Manager deserves commendation for his untiring energy. I noticed that several fields had to be guarded by coolies against the destruction wrought by the monkeys, which are very numerous and could almost be regarded in the same light as the Australian rabbit—a pest. The pigs, which were in a run fenced off by pig-netting in the bush, were looking remarkably well and hardy. I am told they are fed chiefly on cane.

Natal Pines in England.

The following extracts from the Plymouth *Western Morning News* and *Newcastle Chronicle* will be read with interest by Natal fruit-growers as showing the favourable comment which the appearance of our pineapples in the English market is calling forth. The *Western Morning News* of the 18th February says:—"At the present time samples of Natal pineapples are to be seen on show in the windows of the retail fruiterers in Plymouth. They are cheap for the time of the year, and are well within the reach of all classes. We predict a great future for these fruits. In time our colonists will increase the size of their pines in the same way that they increased the size of their peaches. When they have improved the size they will find an increased demand for their dainties, for these Natal pines are excellent. Already the St. Michael pineapple shippers are getting alarmed at the situation. The Natal pines have already seriously affected the market values of the St. Michael fruits, and in the future seasons the competition between them will grow very keen. The friends of the foreign fruit-growers, in London particularly, who are always championing the interest of the foreign exporter to England, will, of course, attempt, vainly however, to minimise our prediction, but it will be verified and more in due course. The Natal pineapple will become the pineapple of the future in the British markets. We stand by the British colonist and the British home grower. As we helped the Cape peach-growers and shippers with our advice through *The Western News*, so we will help the Natal pine shippers to strengthen their position here by sound business methods. If Natal pine cultivators will only ship us larger fruits the trade of future years is in their hands." The *Newcastle Chronicle* of the 20th February says:—"Our Covent Garden correspondent writes:—The arrival of the fine quality pineapples from Natal has caused considerable comment in fruit trade circles. At the present time some excellent specimens of these dainty fruits are to be seen on sale in Newcastle-on-Tyne, and they are growing in popularity with the public daily. The Natal pines are medium sized, and, further, they are obtainable at a moderate price, so that they have been brought within the reach of all classes. The competitive pine from St. Michael's is large, often very large, and more suitable for table or special decorative purposes. Consequently, they are high priced and above the reach of the

majority of the public. The Natal pine has this season made great strides, and bids fair in a few more seasons to take the lead in the trade. As a result of the advent of these new Colonial fruits, the market values of St. Michael pines have declined considerably. The soil of the Colony is perfectly adapted for the production of immense quantities of high-grade medium-sized fruits, and consequently in coming years the British markets will be abundantly supplied with Natal pineapples. A well-known Newcastle packer says that "sales this season so far have been highly satisfactory, and he expects that the demand in coming years may easily be doubled or even trebled."

Lungsickness.

Proclamation No. 79, 1908, declaring a certain portion of the Magisterial Division of Lower Umzimkulu to be an infected area under the Lungsickness Prevention Act, 1897, and Proclamation No. 80, 1908, declaring the farm "Scottsfontein," in the Magisterial Division of Estcourt, to be an infected area under the Lungsickness Prevention Act, have now been revoked.

Demarcation of Crown Forests.

The following notice has been issued by the Conservator of Forests (Mr. E. R. Sawyer) in terms of the regulations made under Ordinance No. 4, 1853:—"In terms of Regulation No. 2 (a) made under Ordinance No. 4, 1853, and published under Proclamation No. 58, 1903, the under-mentioned Crown Forests, having been surveyed, are hereby declared to be Demarcated Forests, within the meaning of the said Regulations. Plans of these forests are now lying in the office of the Conservator of Forests, *viz.*: Block III. (a) Emkazeni, in the Division of Poiela, in extent 60 acres. Bounded North by Lot S 7, otherwise by Block III. Emkazeni. Block III (b) Emkazeni, in the Division of Poiela, in extent 45 acres. Bounded North by Lot S 10, South-east by Location No. 3, otherwise by Block III. Emkazeni. Block II. (a) Stinkwood Bush, in the County of Alfred, in extent 20 acres. Bounded Westwards by Lot F, otherwise by Block II. Stinkwood Bush. Block II. (b) Stinkwood Bush, in the County of Alfred, in extent 155 acres. Bounded Northwards by Gayton Knoxwood and The Park, otherwise by Block II. Stinkwood Bush. Block II. (c) Stinkwood Bush, in the County of Alfred, in extent 36 acres. Bounded Northwards by Block II. Stinkwood Bush, South by Glendale, West by Lot G. Kweletsheni Forest, in the Division of Ixopo, in extent 4,800 acres. Bounded Northwards by Lots 1, 4 and 5 Umkonnye and Umkomaas River, Eastwards by the boundary of Alexandra County, Southwards by Lot 1 Umkonnye and Zondags Kloof, Westwards by Gortref, Dartnell, Lots 1, 2, 3 and 5 Umkonnye.

Introduction of Firewood, etc., into O.R.C.

The Orange River Government have issued a Proclamation No. 13, 1909, amending Proclamation No. 19 of 1908, dealing with the introduction of firewood, brushwood and timber grown in the Colony of Natal to the Orange River Colony across the Natal Border. In accordance with this Proclamation, the introduction of firewood, brushwood or timber grown in the Colony of Natal, with the exception of newly manufactured timber, new or second-hand vehicles and bamboo whipsticks, is absolutely prohibited; no barked wattle or other poles or second-hand manufactured timber, no matter where grown (which has been used in the construction of any building or article, except as hereinbefore provided) may be introduced unless accompanied by a certificate signed by a Justice of the Peace or Stock Inspector of the Colony of Natal or a member of the Natal Border Guard and bearing date not more than seven days previous to date of introduction, to the effect that the timber or vehicles have been disinfected by being dipped in, or thoroughly sprayed with, a solution made by dissolving one pound of arsenite of soda in twenty gallons of water.

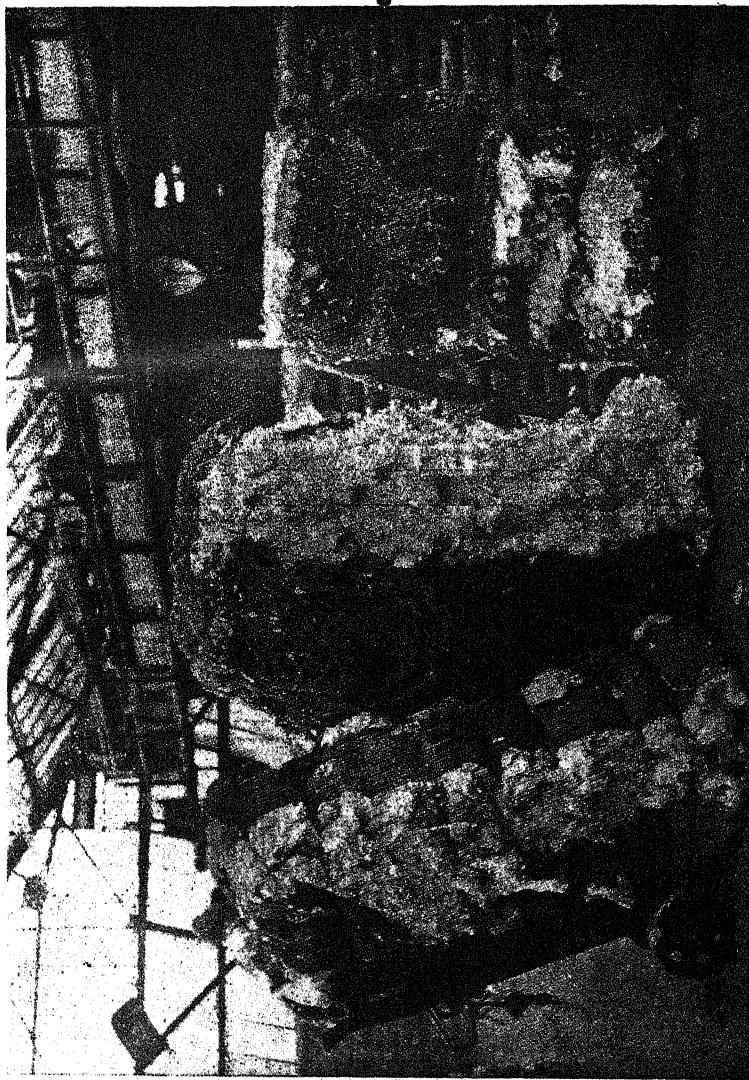
East Coast Fever Regulations.

In terms of Section 3 of Act No. 54, 1906, the Minister of Agriculture has ordered, by Government Notice No. 175, 1909, that, from and after the 1st May, no movement of cattle shall be allowed within the following Magisterial Divisions and portions of Magisterial Divisions, *viz.*: Newcastle, Bergville, Ipolela, Alexandra, that portion of Impendhle Division in which movement was not prohibited under Government Notice No. 614, 1908, and that portion of Utrecht Division in which movement was not prohibited under Government Notice No. 74, 1909; and, by Government Notice No. 176, that, from and after the 15th May, no movement shall be allowed within the Magisterial Divisions of Alfred and Lower Umzimkulu. Notwithstanding this prohibition, however, healthy cattle may be moved from one place to another within any of the said Divisions or portions of Divisions, for immediate slaughter, on permit granted by a member of the Advisory Committees or District Committees of the Divisions, or by persons appointed by such Committees as Permit Officers, and such removal shall be made within the time and according to the directions contained in the permit and not otherwise. Permits for the removal of slaughter cattle by rail from any station in the Divisions must be obtained from the Minister of Agriculture, and will be issued subject to such conditions as he may see fit to impose. It may be remarked that, in terms of Act No. 32, 1903, any person disobeying these orders is liable to a fine not exceeding £100, or to imprisonment, with or without hard labour, and with or without the option of a fine, for any period not exceeding six months.

It having come to the notice of the Minister of Agriculture that considerable movement of hides is taking place throughout the Colony without the necessary permit from a member of an Advisory Committee or Permit Officer, the Under Secretary for Agriculture has notified, for general information, that the removal of hides without a permit is punishable by a fine not exceeding £100, or by imprisonment, with or without hard labour, and with or without the option of a fine, for a period not exceeding six months. The collection of hides from Native kraals and their removal to a centre for disinfection constitutes a breach of the regulations under the East Coast Fever Acts, and cannot be allowed unless the removal of the hides from the kraals is made under permit first obtained from a member of an Advisory Committee or Permit Officer. Land owners and other persons concerned will assist in preventing the illegal movement of hides if they will call upon persons who they may see removing hides to produce the permit authorising their removal, and if they will at once report to the Police or to a member of an Advisory Committee should it be found that the hides are being removed without proper authority.

In terms of Section 7 of Act No. 32, 1903, the Minister of Agriculture has ordered (Government Notice No. 149, 1909) that all cattle running on that portion of the Town Lands of Ladysmith lying to the west of the main line of railway shall, from and after the 30th March, 1909, be kept isolated on the premises of the owner or person in possession of or in charge of such cattle.

During the wet season many young birds fall into a state of bad health, their principal complaints being roup, colds and chicken-pox. After the birds have had any sickness they are thrown back and are never as robust as when they have grown to maturity without a check. In the February issue of the *Journal of Agriculture*, Western Australia, Mr. Frank H. Robertson gives some useful notes on poultry, in which he states that most of the diseases are brought about through want of ventilation in the fowl-houses and over-feeding. He states that the ventilation should be regulated according to the size of the fowl-house, the number of birds kept in it and the season of the year. As many birds as the perches will hold can be crowded into a fowl-house provided there is sufficient ventilation to keep the air cool and pure.



COTTON BALING.—I.

How the American article arrives in England.
(See "*Notes and Comments.*")

Breeding and the Problem of Heredity.

By J. DUNCAN DAVIDSON, A.R.C.Sc. (Dub.), N.D.A.

Biologist, School of Agriculture, Cedara.

I.

THE South African agriculturist and stockbreeder—I do not refer to the recent addition to agricultural literature—must of necessity be intensely interested in breeding problems. The building up of a breed of horses, cattle or sheep, and the production of cereal and other plants suited to the special needs and conditions of South Africa, would be an achievement with which the most eminent agricultural workers might be proud to be associated. The founding of breeds of live stock immune to the virulent diseases which ravage South African studs, flocks, and herds, and the raising of disease and drought-resisting crops would revolutionise the farming of the country.

Breeding in the past has too often been conducted on empirical lines, with very unsatisfactory results. Here and there, despite the drawbacks and faulty methods, genuine improvement has been obtained. Such cases, however, have been the result of the special aptitude of the breeders, who clearly understood what they wanted to produce, and had the power to judge correctly the points which they wished to perpetuate. Such men had an “eye” for the qualities with which they desired to stamp their stock. In not a few cases success was the outcome of mere chance. Naturally, under such conditions improvement was slow and local in its effects. No results were recorded, and the repetition of mistakes was common, and is still, where the rule-of-thumb methods prevail. An error in judgment often destroyed in a single generation the improvement which represented years of strenuous work. Man, unlike Nature, proves faulty in his selection. He often encourages the development of those qualities which render all his efforts futile.

Since the days of Cruikshank there has been no outstanding advance in animal breeding, but in the case of plants much has been accomplished in recent years. This no doubt is largely due to the adaptability of plants for experimental purposes. More individuals can be employed with far less trouble and expense, and the results come to hand sooner. The application of biological principles to the breeding industry is a feature of recent investigations in this connection. Proceeding on biological lines, workers have been able to throw considerable light on the problem of heredity and methods of breeding, and there is now a widespread movement in favour of the investigation of breeding problems

on a scientific basis. The tendency has crystallised in the United States, where an institution for the purpose of improving the existing breeds of live stock and varieties of plants, and the raising of new breeds and varieties, has been founded. The work of this institution cannot be over-estimated. Already there are indications of substantial progress. The proposed researches, investigations in hand, and the points cleared up are discussed at the American Breeders' Association meetings. This body represents the last word—practical and scientific—in American farming. Science is enlisted by expert breeders into the service of the farmers. The advantage which the country derives from the important step it has taken will no doubt materially aid the plant and animal producers in the struggle for the international trade in agricultural produce. Individuals in other countries are doing excellent work, and public bodies are engaged in the improvement of live stock and crop-yielding plants, but there is little or no provision for research work. The farmer cannot devote time to the investigation of breeding problems. It is his business to produce, and this will absorb all his time and energy. The State can best assist the farmer by producing animals and plants of maximum production under the conditions obtaining throughout the country.

The centralisation of control in breeding experiments is necessary. Divided centres of activity must naturally waste much time and energy owing to want of correlation in the work. Uniformity in the process of investigation, and unity and conciseness in the recording of results, demand a central organising machinery. In the breeding industry outside help is useful and suggestive, but the country which is satisfied to allow others to solve its agricultural problems must fall behind in the race for trade. It is to be hoped that a United South Africa will not overlook the claims of the breeding industry.

Before treating the methods adopted by the breeders of live stock in the past it will be well to get a working knowledge of the history of British cattle and sheep, as this throws much light on breeding and heredity. The writer must leave his readers to draw their own conclusions in many cases, as his knowledge of the practical conditions associated with South African farming is strictly limited. The historical account is largely based on the researches of Prof. James Wilson, M.A., B.Sc., under whom the writer had the pleasure of sitting as an agricultural student.

The first cattle to roam the forests and plains of Britain were as large as elephants. They belonged to the "breed" *Bos Primogenesis*. These cattle died out, and were succeeded by a breed which attained the size of a yearling shorthorn. This breed—*Bos longifrons*—had a long, broad forehead, and horns with black tips. It was black in colour. This was the type of cattle which occupied the country when the Romans

invaded Britain. The Romans called the black breed the Celtic short-horn. The breed occupied the whole of Western Europe. About this time—55 B.C.—two other breeds or races of cattle entered Europe from the East, and, proceeding westwards, slowly forced the black cattle towards the outlying districts along the western coast. Of these two races one, a red race, kept to the northern parts of Europe; the other, a white race, occupied the southern districts. The Romans brought white cattle into Britain. These cattle gradually occupied the south-east and eastern parts of the country, and gradually spread as far north as Newcastle and Carlisle. There was a mixing of the black and white blood along the borders of the different districts occupied by the two breeds.

During the sixth, and onwards into the eighth, century red cattle from Northern Europe were introduced by the Anglo-Saxons. This red breed gradually extended northwards and westwards into the southern part of the Midlands and Lincolnshire. The white and black cattle retreated before the red invaders. The white cattle retired into Wales chiefly; the red cattle occupied the south and east of England. At this time there were only black cattle in Ireland.

The Norman invasion in the eleventh century led to much confusion throughout the greater part of Britain, and the white cattle became wild. The Normans hunted them, and in many places the breed was practically exterminated. The white cattle were still tame in Wales. As the population increased the cattle became scarce for hunting, and the Norman lords enclosed them in parks chiefly in the north of England. Subsequent events are lost, more or less, in obscurity. There arose in England a cross between the old Celtic black cattle, the Roman white cattle, and the Saxon red cattle. A new breed resulted called the Longhorn. It was brindled coloured, with black and white markings. This is the first breed of cattle upon which the breeders' efforts at improvement are authentically recorded. In the sixteenth and seventeenth centuries the development of trade between Holland and the East of England led to the introduction of another race of cattle, allied to the red cattle brought in by the Saxons. The newcomers were flecked red and white cattle, and they occupied a part of the north-east country embracing part of Yorkshire and Durham.

(To be continued.)

The hog converts food into meat, and it should be remembered that it takes clean food to make healthy meat. Pure water, wholesome food and a clean place to drink and eat are the secrets of healthy meat.

The Manuring of Tea.

By GEORGE A. COWIE, M.A., B.Sc.

(*Continued.*)

ARTIFICIAL MANURES.

IN the previous chapters we have briefly dealt with the properties and uses of the organic or natural manures, and we now pass to what might be designated the mineral or artificial fertilizers. As has been pointed out, the value of farmyard manure does not depend so much upon the amount of plant food that it contains as on the effect that it exerts on the physical condition of the soil. Not only are the plant food ingredients present in this manure in very small quantities, but they are also combined in such a manner that they do not become available to the plant until the manure has undergone complete fermentation and putrefaction. When, therefore, a manure is required that will deliver up its fertilizing substances quickly, farmyard manure or natural manures of any kind must not be used. Instead, recourse must be had to the artificial manures in which the essential food constituents are present in an easily assimilable form. It is quite conceivable that by the continuous application of natural manures the soil could be kept supplied with the necessary amount of available fertilizing substance, but it has been found that the best results are not obtained from this method, by which, in course of time, the physical condition of the soil would suffer through the presence of a superabundance or organic matter. Besides, in tropical countries farmyard manure can only rarely be obtained in sufficient quantity to supply the needs of the plant. It has been proved, moreover, by repeated experiments, that natural manures produce the best results when used judiciously with artificials.

The chief artificial manures are classified, according to the particular plant food ingredient which each supplies, under four different heads, nitrogenous, phosphatic, potash and lime.

NITROGENOUS MANURES.

The nitrogenous manures owe their importance to the fact that they furnish to the plant the essential constituent—nitrogen. Nitrogen in its simplest form belongs to the class of substances known as gas, so that if it is spoken of in connection with artificial fertilizers, it must be understood that it is present in them in chemical combination with other

elements. Since, as we have seen, nitrogen forms so large a percentage of the tea leaf, care must be taken that the tea crop is well supplied with nitrogenous manures. On this constituent may be said to depend the flushing or leaf-producing power of the tea plant. In the absence of a sufficiency of nitrogen it is quite impossible to grow full crops. It must also be remembered that not only does the growing crop make large demands upon it, but it is exceptionally liable to be washed out of the soil in the form of nitrates by heavy rains. It is, therefore, important that nitrogenous manures be applied at a time when the crop is in an actively assimilative condition, for, if applied at any other time, great loss of nitrogen is certain to be incurred in the above manner.

Nitrogen is taken up by the plant only in the form of soluble nitrates. In no other combination is it available to the plant. It therefore follows that nitrate of soda, which can be assimilated directly by the plant, is quicker in its action than the other nitrogenous manures, which, before they become available to the crop, must become transformed into nitrates. This change is brought about in the soil by certain bacteria, and the length of time required to effect the change will depend upon the particular chemical combination in which the nitrogen is present in the manure. Sulphate of ammonia, for example, although quite soluble in water, is slower in its action than nitrate of soda by reason of the fact that it must undergo this change before it can be utilised by the plant. Nitrogen organic manures, like dried blood, fish guano, oilcake, and horn meal, required still longer time for their conversion into an assimilable form, and thus their nitrogen is less available to the plant than that in sulphate of ammonia.

SULPHATE OF AMMONIA.

This is one of the chief nitrogenous manures for tea. It is a by-product in the manufacture of coal-gas and coke, and contains about 20 per cent. of nitrogen. In its original form it is not assimilated by plants. It must first be transformed into nitrate, and this transformation can only take place in the soil if the latter is sufficiently supplied with lime.

Regarding its effect on tea, Dr. Mann states in the summary of his report on manurial experiments carried out in 1905 and 1906 at the Heeleaka Experimental Station, in the Jorjor District of Assam: "Failing oilcake, the cheapest and most effective artificial manure at present is sulphate of ammonia, but this will, at any rate occasionally, have to be combined with mineral manures, and its use will involve an occasional small dressing of lime, as well as fairly frequent green manuring. This last must be done because the manure, unlike oilcake, contains no organic matter, and if this latter disappears the condition of the soil will be wholly spoilt."

According to Mr. Kelway Bamber, it is advisable in certain instances to apply a small quantity of this manure alone at a period when the bushes are tending to shut up. This would act as a slight stimulant and cause the bush to yield for some time larger, and also lengthen the period between the prunings.

NITRATE OF SODA.

This manure contains about $15\frac{1}{2}$ per cent. of nitrogen, and in India and Ceylon at least is somewhat dearer per ton than sulphate of ammonia. It is not very often used for tea manuring, as its application has so stimulating an effect upon the growth of the plant that the quality of the tea is apt to be detrimentally affected. Besides, it is particularly liable to be washed out of the soil by rain. If, however, care be taken to apply this manure in small quantities at one time, so as to reduce the risk of loss by washing to a minimum and at the same time prevent a too rapid growth of leaf, then profitable results may be expected from its use. It has, however, an advantage over sulphate of ammonia in respect that it does not rob the soil of its mineral constituents, and especially of its lime. In the Heeleaka experiments referred to above the use of nitrate of soda proved to be quite remunerative. Dr. Mann states in the report: "On the whole, for the two years in question, the use of both sulphate of ammonia and nitrate of soda has been distinctly profitable at Heeleaka, and with an improved bush at the end of the period, it may be said that the treatment has been a considerable success. But it must be remembered that, valuable as these manures are, they cannot be permanently employed without the use, in addition, of mineral manures containing phosphates and potash."

NITRATE OF POTASH.

Nitrate of potash is also sometimes employed as a source of both nitrogen and potash, but, after eliminating the advantage of the potash which it contains, the nitrogen in it is distinctly dearer than in either sulphate of ammonia or nitrate of soda. It is a very quick acting manure, and the nitrogen that it supplies to the soil is in a form that is very easily washed out by rain. As it contains less nitrogen than nitrate of soda, the quantity necessary to replace this manure would have to be increased by about one-fifth to obtain the same effect. There is also evidence to show that even allowing for the difference in composition, saltpetre or nitrate of potash is not as good a nitrogenous manure for tea as nitrate of soda.

OIL CAKES.

Oil cakes are very important manures in the fertilisation of tea, and as sources of nitrogen cannot at present be approached in cheapness. They are particularly suitable for forming the basis of mixtures. As

they are slow acting organic manures, their effect is spread over a considerable period of time.

CASTOR CAKE.

This is one of the most useful nitrogenous manures for tea, and as a basis for other mixtures is excellent. The percentage of nitrogen in best white castor cake is high— $6\frac{1}{2}$ to 7 per cent., and works out moderately cheap.

RAPE CAKE.

Rape cake is also a useful source of nitrogen, and is used in Japan with very good results. It is not so rich in nitrogen as castor cake. It is also a slow acting manure.

DRIED BLOOD.

Dried blood is also used as a basis of nitrogen for the manuring of tea, and usually contains over 12 to 13 per cent. of nitrogen. Being concentrated, it is suitable for carrying long distances.

POTASH MANURES.

As we have already seen, the amount of potash removed by the tea-leaves stands next to that of nitrogen. In the early stages of growth, especially, large demands are made upon this constituent. It has not yet been satisfactorily determined what exact function is performed by potash in plants, but it is known that through its deficiency in the soil plants are incapable of building up the carbohydrates which are indispensable to their life. Potash is found in plants in both organic and inorganic combinations. The potash salts of oxalic, tartaric, citric, and malic acids are quite common, while inorganic salts, such as carbonate, sulphate, phosphate and chloride of potash are also found. In what form potash accompanies the carbohydrates in their transportation through the plant is not yet known. Potash is, however, necessary for the proper formation not only of carbohydrates, but of the more complicated compounds called albuminoids. It also exerts a marked influence on the production of tannin, which, as is well known, imparts pungency to the leaves of the tea plant. The absence in the soil of a sufficient quantity of potash is at once shown by the unhealthy appearance of the leaves, and occasions either a premature decay of the individual plants or at least an unsatisfactory crop yield both in quantity and quality.

Mr. John Hughes considers that potash is of overwhelmingly great importance in the production of high grade tea, and he states that in a number of good class tea which he examined, the price very fairly corresponded with the sum of the soluble potash and phosphoric acid taken together in the plant.

Dr. J. A. Voelcker, who made investigations for the Government in India in 1889, 1890 and 1891, in his book on "The Improvement of

Indian Agriculture," says: "In the Neilgherries, for instance, there is good reason to believe that a deficiency of lime, if not of available potash also, had had to do with the decadence of tea cultivation there."

Potash may be applied to the soil in various forms, but the most useful potash manures for the tea crop are the sulphate and the muriate of potash.

SULPHATE OF POTASH.

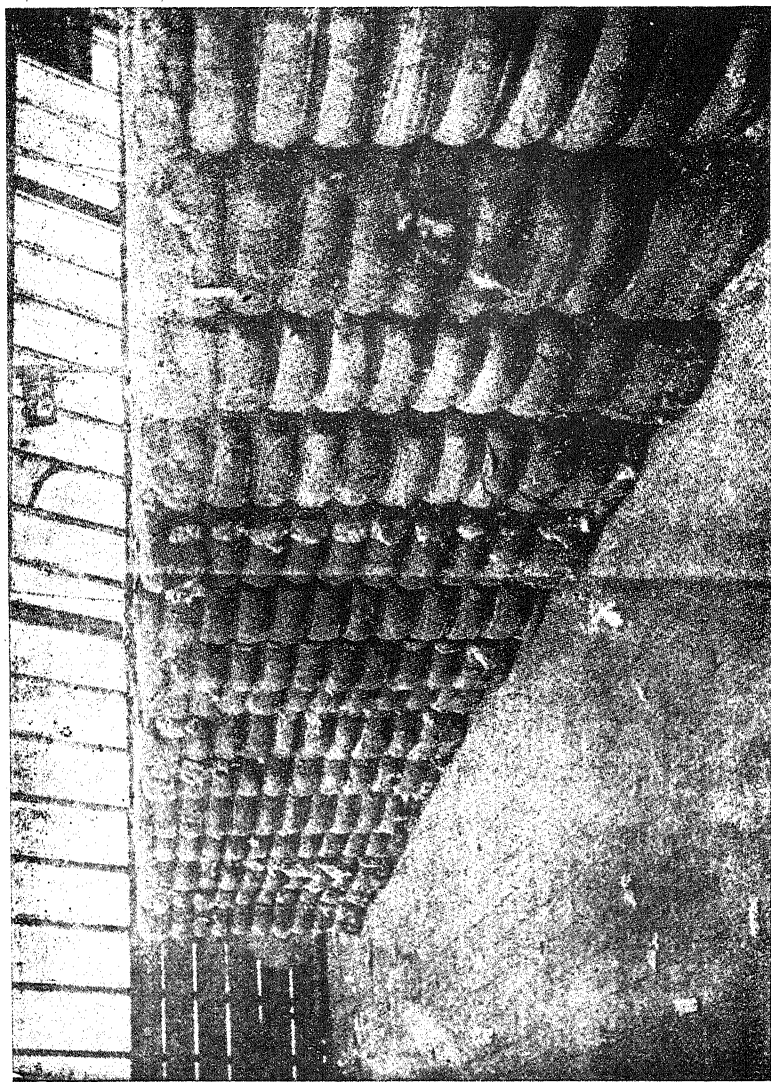
Sulphate of potash is supplied in two grades, 90 per cent. and 96 per cent., corresponding to 48.6 per cent. and 51.8 per cent. of pure potash respectively. This manure is specially recommended for soils that are deficient in lime, as its application is not followed by the disappearance of the latter constituent from the soil through any solvent action. Rapid growth and early maturity are obtained by the use of sulphate of potash. As sulphates also are generally required by tea for the formation of the large proportion of proteid matter present in the leaf, this form of potash is specially serviceable for the tea plant.

MURIATE OF POTASH.

Muriate of potash is obtainable in the following different qualities: 80 per cent., 85 per cent., 90 per cent., and 95 per cent., corresponding to 50.4 per cent., 53.5 per cent., 56.7 per cent., and 59.7 per cent. of pure potash respectively. It is one of the cheapest forms of potash that are put upon the market. It can be employed, however, with advantage only on soils containing an ample supply of lime, as its effect on this constituent is to convert it into the chloride, which, being a soluble compound, is easily washed out of the soil by rain. The muriate of potash, being more soluble than the sulphate, is not retained so well by some soils, and the chlorine which it supplies is not so necessary to the soil, as the latter is generally kept sufficiently enriched in this constituent through the sodium chloride of the rain. It has, however, a greater solvent effect than the sulphate of potash on other soil constituents, and for this reason could occasionally be added to mixtures with advantage.

KAINIT.

Kainit is a mixture of sulphates and chlorides of potash, magnesia and soda, and is employed as a manure in the original condition in which it is found in the mines of Germany. As it contains a lower percentage of potash (12.4 per cent.) than the other potash salts, the cost per unit is enhanced through the extra cost of carriage, etc. It is on this account not used as a source of potash in the manuring of tea to the same extent as the forementioned manufactured concentrated salts. Kainit has, however, advantages peculiar to itself. It possesses specially valuable antiseptic properties, and acts often effectively as a check to fungoid and other diseases. In certain cases where magnesia is very deficient in



COTTON BALING.—II.

How the Egyptian article arrives in England.
(See "*Notes and Comments*,")

the soil, and some potash is also required, kainit would be found to be very useful. It can be employed also with advantage as a covering to dung heaps, in order to fix the valuable gaseous nitrogenous compounds which are evolved in the course of the fermentation of the manure.

NITRATE OF POTASH.

The high price of this manure does not admit of it being freely used as a substitute for the above-mentioned potash salts. Its effect, likewise, has been found to be not so beneficial as that produced by potash and nitrogen separately applied.

WOOD ASHES.

Wood ashes are sometimes used as a source of potash, but their limited supply, and the low percentage of potash contained in them, prevent them from becoming an important means of supplying this particular plant-food constituent to the soil.

(To be continued.)

One good horse, cow or pig is better than two poor ones. It is a great deal better to strive to have your animals of the very best quality than it is to see how many more you can have than your neighbour.

The measure of success attained by those who raise hogs depends in no small degree upon the judicious selection, for breeding purposes, of sows that are best calculated, in their form, and general make up, to give birth to, and to nourish for several weeks, a reasonable number of well-formed, thrifty, vigorous pigs. The sow . . . should be selected from a stock, or family, in which fertility is a characteristic; for this essential quality is hereditary, though lacking in numerous strains of the various breeds. . . . Where it is practicable, it is better to defer the selection of sows for breeding purposes until they have made considerable growth, and exhibit prominently certain characteristics which they should possess, and enable the breeder to form a more nearly correct judgment as to what their forms will be when they have matured.—*F. D. Coburn ("Swine Husbandry.")*

Export of Fruit.

SOME USEFUL HINTS AND INFORMATION.

II.

THE following is a continuation of the circular recently issued by the Cape Department of Agriculture, the first instalment of which we printed in our last issue:—

IV. *Packing and Grading.*—The greatest possible care must be given to every detail involved in the packing and grading of fruit.

The packages approved of for export purposes for the various sorts of fruit are as set forth in the following table, which gives, in the cases of the principal export fruits, two sizes to meet the requirements of “Extra Selected” and “Selected” qualities. The prices in the third column are those at which boxes were supplied under the Government scheme during the season 1908, being the lowest figures secured by public tender. The depth of the boxes, it may be noted, can be, when orders are given, made greater or less at pleasure, and for the ensuing season shippers must use their discretion in the use of deeper or shallower boxes for certain kinds of fruit, in view of special suggestions made hereafter.

Class of Box.				Size.	Price per Box.
Large Grape ...	...	...	...	24 x 18 x 6	7½d.
				24 x 18 x 6½	7¾d.
Small Grape ...	...	...	...	18 x 12 x 6	4d.
				18 x 12 x 5½	3¾d.
Peach ...	...	...	...	18 x 12 x 4	3½d.
				18 x 12 x 3½	3¼d.
Plum ...	...	...	...	18 x 12 x 3	2¾d.
				18 x 12 x 2¾	2½d.
Pear ...	...	...	...	18 x 12 x 6	4d.
				18 x 12 x 5	3¾d.
Apricot ...	...	...	...	18 x 12 x 2½	2½d.
				18 x 12 x 2	2¼d.
Orange ...	...	...	...	27 x 12 x 12	10d.
Half Orange ...	...	...	...	13½ x 12 x 12	6½d.

The following remarks with reference to the packing of different fruits should be carefully studied:—

Apricots.—This fruit during past seasons has been far too extravagantly packed, and it is strongly recommended that apricots be packed in larger and deeper boxes with divisions for each layer of fruit, or otherwise in separate trays, three of which should be nailed together to save space, the two lower boxes not requiring covers. Each fruit

should be wrapped in a piece of tissue paper, and this it is suggested might be printed with some ornamental device or with the trade mark of the shipper. Very little woodwool should be used, none being placed between the fruits—its only purpose being to protect the fruit from the wood at the top and bottom and sides of the case.

Plums.—The packing of this fruit has heretofore been generally satisfactory, but it is urged that after the most careful grading as to size and condition of ripeness each fruit should be wrapped in a suitable piece of tissue paper, preferably with some fancy printing, and should then be packed very closely into the trays with very little woodwool. As in the case of apricots, woodwool must only be used to protect the fruit from the wood, and it is suggested that from three to five trays or small boxes should be nailed together with a view to saving labour in handling and a reduction of markets dues.

Peaches.—The packing of peaches has on the whole been highly appreciated, but for the reasons stated in the case of plums it is advisable to nail each three boxes together. Some shippers have used wadding instead of woodwool, and, although this is not considered of advantage, it has been observed that the fruit so packed reached the market in very sound condition. Where wadding is used the smooth side of the cotton must be placed against the peach, as otherwise the fibre will adhere to the woolly surface of the fruit and give it a bad appearance. Closer packing is to be recommended with less woodwool or other material.

Nectarines.—The observations with reference to peaches will apply, but this fruit must be of good size and colour and of the *freestone* variety.

Pears.—As little woodwool as possible must be used and every effort made to place the largest quantity of fruit possible in each box. The retail fruit vendor attaches naturally much importance to the quantity as well as the quality of the fruit in each box, and the Trades' Commissioner has pointed out that large numbers of boxes of pears reach the market containing only 16 fruits which might easily comprise 20 or 24. It is specially necessary in the case of pears to exclude badly-shaped fruits or those in any way injured, as a few such specimens in a box will probably spoil the price of the remainder. Each pear should be wrapped in a piece of white sulphite paper, and, with a view to saving cold storage space and market dues, three

single layer trays nailed together is desirable in making up shipments.

Grapes.—Shippers must keep in view the fact that almost the whole of the best grapes brought into the English markets during the winter months are used largely for decorative purposes, and therefore the fruit must, above all things, have the very finest appearance. It must be sound, dry, as attractive as possible, must retain its bloom and the berries must be large. The 'Trades' Commissioner has had considerable difficulty in consultation with the leading dealers in Cape fruit in Great Britain to decide upon the most suitable methods of packing. To meet these requirements he has suggested, as one means of placing Cape grapes in the most attractive manner before the consumer, the Continental method of packing in baskets or punnets, which are then placed in crates. As the Department has already issued a circular to the Press and to all exporters dealing fully with this method of packing, it need not be enlarged upon here. The sample crates and punnets are available for inspection at the Department, and the fullest particulars will be furnished on application.

So far as the present system of packing in boxes is concerned, shippers must in future wrap their grapes first in white sulphite paper and then pack tightly in woodwool. Too much woodwool must not be used, and it is reported that shipments in which very little packing material was employed arrived always in perfectly sound condition. The object of using woodwool is not to preserve the grapes, but to protect them from being shaken and bruised, and the sulphite paper aims at preventing the woodwool becoming mixed with the berries and secure for the bunches a neater appearance when taken out of the boxes. Shippers are left entirely to their own discretion whether they shall use the large or the small grape box, opinion being divided among fruit factors whether the one or the other is preferable, and it is of particular interest that the weights stamped on the boxes should not be greater than the actual amount of the contents when supplied to the retailer. Economy in packing must be carefully attended to, as there are constant reports of waste of space and woodwool in putting up small quantities of fruit in boxes than the box can contain with efficient packing.

It cannot be again too forcibly impressed upon growers of grapes for export that the thinning of bunches is essential to profitable trade, and in the English hothouse grape nurseries, from which grapes are frequently sold from at 2s. 6d. to 3s. 6d. per lb., it is estimated that it costs ½d. per lb. to attend to the work of thinning out. The Trades' Commissioner estimates that, with care, thinned Cape grapes will fetch

from 3d. to 6d. per lb. more for any given variety than if left unthinned.

The woodwool for fruit packing must be of fine quality, but at the same time clean, bright and elastic. Much of the woodwool used during the past season was objectionable, because of its coarseness and hardness of fibre. The Department of Agriculture will secure characteristic samples of woodwool suitable for export purposes, which will be available for inspection by shippers.

The sulphite paper specially commended for export trade can be inspected at the Department of Agriculture, and samples of various qualities have been supplied to the principal houses in the paper trade in Capetown in order that quantities may be stocked for the use of exporters.

V. Branding of Packages.—Every package containing fruit for export should be clearly branded on the ends with the quantity of fruit, name of variety, and the name of the shipper. Should a shipper have a special brand for his fruit this may be used in addition to, or alternative to, the shipper's name; but too much stress cannot be laid on the necessity of accurate branding. In the case of grapes, the net weight, after allowing 20 per cent. for shrinkage, should also be stamped on the ends of the cases.

VI. Handling and Loading.—With all fruits for export the gentlest and most careful handling is necessary in packing, riding to the stations, and loading and offloading on the railway. Boxes of fruit should not be thrown carelessly, or placed on their ends, and it is advisable that some soft material, such as wood shavings, straw or hay, should be placed on the floors of farm wagons and railway trucks before loading. The personal supervision of the farmer himself should be given to the transport of fruit from the farm to the station, and its handling and loading at the station.

VII. Consignment Notes.—Heretofore special forms of consignment note were used for fruit shipped under the Government scheme, and copies of these documents were always checked by the Department of Agriculture to ensure accuracy on bills of lading and invoices. This to a certain extent kept a check on carelessness in the preparation of consignment notes, but with the withdrawal of the scheme the shipper must look to his own interest in carefully filling up the quantity, variety, marks or brands and weights of all consignments delivered at railway stations or sidings. Copies of consignment notes should be carefully kept, and the special labels provided by the Railway Department should be used. All fruit should be consigned to the Dock Superintendent, Capetown, after the necessary arrangements are made with the Harbour Board for the handling of shipments, and the full name and address of

the European agent, with any special shipping instructions, should be forwarded at the same time.

VIII. *Inspection of Fruit*.—In order to meet the wishes of shippers, the scheme of Government inspection of fruit will be continued on somewhat similar lines to that in operation during the past season. It must be understood, however, that only the fruit of those shippers who shall have previously signed and forwarded to the Department of Agriculture an agreement in the form shown in Appendix "B" attached to this bulletin will be examined, and it is requested that shippers desirous of having their fruit inspected and branded by the Government should notify this office before the 31st October next.

A list of the minimum sizes for the different varieties of fruit is being prepared, and no fruit of a smaller size than that fixed shall be passed by the inspector as eligible for export.

The conditions relating to the inspection of fruit shall be published in the *Government Gazette* on an early date and circulated to all shippers.

IX. *Cables*.—The Government will continue its system of cable advices to the Trades' Commissioner with reference to the quantities and varieties of fruit shipped, but should any individual shipper desire to cable, the especial code in use by the Department will be at his disposal, and any facilities that can otherwise be afforded him will be available.

X. *Agents for Sale of Fruit in Europe*.—The Department of Agriculture has taken steps to compile a special list of the most reliable agents in Great Britain and certain of the principal Continental cities in Europe for the sale of Cape fruit. All such agents have been selected with due regard to their financial standing and business connection, and their names and addresses will be available for exporters on application. It must, however, be clearly understood that, while the Department of Agriculture has made the strictest enquiries with regard to the agents whose names appear upon its list, it cannot take any responsibility whatever for the business relations between shippers and such agents. Shippers are recommended, through their banks, or otherwise, to inform themselves, in addition to the information supplied by the Department, of the reliability and business reputation of those to whom they consign fruit. It is recommended wherever possible that the shipment of fruit should be effected through one of the South African Banking Companies, whose European branches would in the circumstances take every precaution to protect its customers.

XI. *Reports from Trades' Commissioner and Agents*.—Shippers of Cape fruit, in their efforts to attain the highest standard possible, should strenuously endeavour to carry out the suggestions made in their special reports by the Trades' Commissioner and the principal fruit agencies in London. It is deplorable the extent to which, in the face of continued warnings, shippers of fruit during the past season continued to

repeat the same mistakes from day to day. Although every report received was published throughout the Colony in both languages, there was apparently very little serious notice taken of the recommendations and suggestions constantly thrust upon shippers of fruit.

XII. *Invoices and Accounts.*—It is suggested that shippers of fruit should provide themselves with neat invoice books setting forth in the case of each shipment the fullest particulars of quantity, weights, numbers, marks, date of delivery to railway, steamer by which shipment is intended, and full name and address of consignee or agent. These invoices, with the use of carbon paper, might be made out in triplicate, one copy being tacked on the consignment of fruit on the end of a box and under a slip marked "Dock Superintendent." This would enable the Harbour Board authorities to check each parcel of fruit with the railway consignment note. A second copy should be sent direct to the London or other agent of the shipper and the third kept for reference. Shippers should arrange with their agents to have general reports by next mail on the condition in which their fruit was received, and its quality and general character, and payment of accounts through a bank or otherwise should be provided for at periods of from seven to fourteen days after the sale of fruit, except, of course, in those cases where a bank was the medium of collection, or where accounts were "Cash against Documents."

(To be continued.)

A horse must have sufficient time to eat, if he is to get the most benefit from his food. Do not be in too big a hurry to get into the field after feeding.

Courage and perseverance are valuable assets for the farmer. There are many discouraging things in farming, but the good men are the ones who never say die.

Don't forget to keep up an acquaintance with the yearling colt. The first season they are out on pasture they are apt to become wild unless they are handled occasionally.

The Frozen Meat Trade.

REVIEW OF THE PAST YEAR.

As stated in our last issue, we were unable, owing to pressure upon our space, to give a summary of Messrs. W. Weddell & Co.'s "Review of the Frozen Meat Trade" for 1908, a copy of which was sent to us by the Commercial Agent for Natal. We now, however, present our readers with the most interesting portions of the "Review," together with a study of the imports of meat during the year under review as shown by Messrs. Weddell & Co. in their separate charts, etc.

The conditions of trade in the United Kingdom, it appears, were by no means good during the year just closed. Some idea of the reduction in the spending powers may be formed from the all-round shrinkage shown by the Board of Trade returns. As compared with 1907, imports in 1908 fell off to the extent of £52,667,219, and exports to the extent of £61,092,019.

Although values of most classes of goods imported into the United Kingdom receded last year, there was, on average, a slight advance in the case of fresh meats. This distinctive position, established in face of the general trade depression, and despite a dragging market for both frozen and chilled meats during the latter part of the year, is, however, capable of a simple explanation. It resulted entirely from a reduction in the volume of imports.

In North America, still the chief foreign source of supply, the scarcity and dearness of native stock led to a steady falling-off in shipments of beef and live stock to this country; and by the end of the year the diminution as compared with 1907 amounted to the equivalent of 80,000 tons of meat. Australia and New Zealand also reduced their exports by 11,782 tons and 15,545 tons respectively. South America alone of the exporting centres increased its output, and did so to the extent of 59,127 tons, largely through the development of the Argentine chilled beef trade.

One of the most noteworthy features of the year was the amount of public attention devoted to the operations and methods of the large American meat packing houses. In the United States and in this country their doings are forming the subject matter of Government enquiry, with a view to ascertaining whether or not their elaborate and widespread machinery for the control of supplies and prices amounts to undue interference with the free course of business. As yet the charges made have not been proven. It is, however, interesting to note the large proportion of the meat trade of the United Kingdom handled by these

shippers. About one-third (or 626,421 tons) of the beef, mutton and lamb consumed in this country is imported from all sources. Of that quantity, the United States furnished in 1908, in live cattle and sheep and chilled beef, 157,320 tons. This huge volume of trade is controlled by four or five firms. It is true that the exporting power of the United States has shrunk materially in recent years; but the acquisition of freezing works in the Argentine by North American operators is now beginning to counteract that shrinkage. Already two of the largest and most modern establishments have thus been secured, the exporting capacity of which may be taken at about 80,000 tons per annum. Excluding Canada, the volume of export from North and South America together, thus controlled by the various members of the United States' meat trade, now aggregates about 237,320 tons per annum, or 37.88 per cent. of the whole British importation of beef, mutton and lamb.

The South American freezing works exported to the United Kingdom 271,568 tons, Australia 37,430 tons, and New Zealand 104,274 tons last year.

Although only a little over one-third of the fresh meat consumed in this country is imported, the scientific manner in which that portion is concentrated upon the big markets of the country results in its having a much more important influence upon values generally than its volume would seem to render possible. In effect Smithfield market practically rules the price of imported meat throughout the country; and if any group of operators could secure control of Smithfield they would control the prices of all fresh meat in the United Kingdom, and indirectly regulate the values of most of the live stock owned by the British farmer. That one market absorbs on average 2,400 head of cattle, and 14,000 sheep and lambs *daily*, or, in aggregate, 333,250 tons per annum. This is nearly 20 per cent. of the nation's consumption; and the mere fact of so large a proportion being concentrated upon the great London market enables it, for better or worse, to outweigh all the small and scattered provincial markets put together, so far as establishing a basis of meat values is concerned. Inasmuch as Great Britain is the only large market upon which Australian, New Zealand, and South American producers can rely, it has become a matter of vital importance to them, as well as to the British farmer, to watch jealously any new developments which are likely to influence the trade at Smithfield.

SUPPLIES OF FROZEN MEAT.

Mutton.—The total supply of frozen mutton during 1908 was 5,578,560 carcases, or fewer than during the previous year to the extent of 222,975 carcases. The decreases of 315,310 carcases from Australia and 282,628 carcases from New Zealand were only partially counterbalanced by the increase of 374,963 carcases from South America.

Lamb.—The total arrivals of lamb from all sources were 4,072,858 carcasses, being 276,134 carcasses less than during the previous twelve months. There were decreases of 191,375 carcasses from Australia, and 280,581 carcasses from New Zealand, while, on the other hand, importations from South America were 195,822 carcasses (or over 150 per cent.) in excess of last year.

Taking mutton and lamb together, Australian arrivals were 506,685 carcasses fewer and New Zealand 563,209 fewer than in 1907; but from South America an increase of 570,785 carcasses is recorded.

Beef.—The positions of the suppliers of beef were almost entirely reserved as compared with 1907, when Australasia showed large increases and the South American import was barely maintained. In 1908 Australia delivered only 2,683 quarters more than during the previous twelve months, New Zealand actually fell short to the extent of 41,160 quarters, while South American deliveries were 212,247 quarters in excess of 1907. The total receipts of frozen beef were 1,788,159 quarters, or 173,770 more than in 1907.

MARKET, PRICES AND QUALITY.

Mutton met a dragging sale right through the year, the drift of the consumptive demand being still more pronounced than before in favour of lamb and beef, to the greater exclusion of mutton.

Australian importations were 625,067 carcasses less than during the previous twelve months; but, nevertheless, supplies were at all times equal to the restricted demand. Prices followed a course about $\frac{1}{4}$ d. per lb. on average below the rates current for River Plate mutton. The quality, as a whole, gave satisfaction, but in many parcels there was much greater irregularity than need have been, even after so dry a season as was experienced in parts of the Commonwealth.

New Zealand arrivals were irregularly spread over the year, monthly receipts ranging between 70,874 carcasses in February and 219,386 carcasses in May. At times, Canterbury mutton was scarce and dear; but, generally speaking, supplies were quite sufficient for requirements. Southland sheep were marketed in moderate quantities at prices usually $\frac{1}{4}$ d. per lb. below Canterbury's. North Island sheep maintained their popularity with buyers, and on few occasions did the difference in price between best Wellington and Canterbury sheep amount to more than $\frac{1}{4}$ d. per lb.

South American supplies aggregated 3,263,086 carcasses, and were in excess of those of the previous year to the extent of 374,963 carcasses. The improving quality and moderate price of Argentine sheep made them attractive to retailers; but the market frequently found difficulty in coping with the increased quantities available, and relative prices were usually $\frac{1}{4}$ d. per lb. below those current for good average North Island,

N.Z., sheep of similar weight. Sheep from Uruguay and Patagonia arrived in considerable numbers, and found buyers at about $\frac{1}{2}$ d. per lb. less prime Argentine carcasses.

LAMB.

Heavy supplies were received from Australia in January. For the remainder of the year arrivals were light. The proportion of inferior lambs was unduly large; but at the very low prices accepted for these, there was a remarkably good demand, which was maintained till the close of the season. Good quality lambs were relatively firm throughout, at a substantial premium. The new season opened rather late at a fairly satisfactory level of prices for all grades, and stocks were in moderate compass at the end of December.

New Zealand.—The somewhat reduced quantities received went steadily into consumption as they came to hand, and prices for prime Canterbury lambs stood at a fairly high and unusually even level right through the year. The only exception was in the case of 42 50-lb carcasses, which, in the early months commanded exceptionally high prices owing to the scarcity of English mutton, but from the end of September were practically unsaleable owing to the keen competition from Dutch lambs. A specially noteworthy feature was the proximity of prices for all grades of New Zealand lambs to those ruling for best Canberrys. The explanation of this is to be found in the fact that provincial retailers were unable to make any profit on New Zealand lambs at the high wholesale prices established by the Smithfield market, and they hit upon the expedient of using large quantities of the lower grades (which were obtainable at fractionally less cost), even though with lessened satisfaction to their customers.

South America.—Supplies from this source were more than doubled during 1908. Importations increased from 127,106 to 322,928 carcasses. Stricter grading for quality and weight is much needed, but nevertheless River Plate lambs sold fairly readily at prices slightly below those current for fair average Australian lambs. It is evident that Argentine shippers are now beginning to reap the benefit of the continuous efforts made to develop the export trade in lambs, and that they intend to extend this class of business still further next year. Fair numbers also came to hand from Patagonia.

During the last three months of the year the exceptionally heavy supplies of fresh-killed mutton and lambs (Home and Continental) almost monopolised the market. Considerable difficulty was experienced in finally closing up the small stocks of New Zealand lambs, and in making prompt sales of the early deliveries of Australian lambs.

BEEF.

Arrivals of Australian beef were very small (only 75,800 quarters), and that description was a quite unimportant factor in the trade in the

United Kingdom. The quality of the beef was satisfactory, and prices were good, but were dominated by the values for River Plate frozen beef.

New Zealand shipments were not maintained at the same volume as during the preceding twelve months, and the percentage of really prime quality was relatively small. A considerable proportion of receipts, which aggregated 179,002 quarters, consisted of old cow beef.

South American arrivals totalled 1,533,357 quarters, an increase of 212,247 quarters, equivalent to 16 per cent. Assisted by the moderate marketings of Australian and New Zealand beef, South American shipments met a fairly good market right through the year. Owing to the advance in United States beef, sharp rises in price took place in June and August: but these were discounted to some extent by the low level of prices current during November and December, when chilled beef of all classes was exceptionally cheap. The quality as a whole was satisfactory; but only occasionally were parcels of really choice frozen beef available, the best being shipped chilled.

The following statement, which we have prepared from the fourth of the charts issued by Messrs. Weddel & Co. with their "Review," will give an idea of the distribution of imports of frozen meat into the United Kingdom throughout the year:—

IMPORTS OF FROZEN MEAT INTO U.K., 1908.

				From Australia. <i>Carcases.</i>	From New Zealand. <i>Carcases.</i>
LAMB :—					
January	...	...	...	401,610	25,109
February	...	...	...	153,173	101,717
March	...	...	...	118,643	264,328
April	...	...	...	94,124	384,392
May	...	...	...	43,004	423,314
June ...	...	...	...	33,051	302,085
July ...	...	...	...	37,981	371,574
August	...	...	...	36,726	331,109
September	...	...	...	30,299	215,448
October	...	...	...	28,516	80,056
November	...	...	...	69,592	35,492
December	...	...	...	159,460	8,627
Total ...				1,206,179	2,543,751
MUTTON :—					
January	...	...	...	109,559	106,264
February	...	...	...	49,495	70,874
March	...	...	...	33,360	153,798
April	...	...	...	11,153	157,611
May	...	...	...	17,832	219,286
June	...	...	...	40,747	166,476
July	...	...	...	49,347	140,827
August	...	...	...	40,885	143,946
September	...	...	...	28,315	200,693
October	...	...	...	86,530	155,797
November	...	...	...	91,125	90,982
December	...	...	...	86,719	83,853
Total ...				625,067	1,690,407

Sugar-Cane Cultivation.

RECENT PROGRESS IN ZULULAND.

THE Minister of Agriculture has received from the Manager of the Zululand Sugar Manufacturing Co., Ltd. (Mr. A. Warner), some interesting information relative to the progress of sugar-cane cultivation in Zululand, which we have the pleasure of publishing herewith by permission of Mr. Warner.

At the end of the year 1908 there were held under lease from the Natal Government the following farms, *viz.*:—

Class of Farm.				No. of Farms held.	Total Acreage of each class.
First	...	...	...	47	20,604
Second	...	...	...	29	20,811
Third	...	...	...	28	27,150
Or a total of				104 farms	= 68,565 acres

There was under cultivation at the close of the year 1908 sugar-cane extending over the following areas, *viz.*:—

1st class farms	...	...	...	3,857 acres
2nd class farms	...	...	...	1,470 acres
3rd class farms	...	...	...	247 acres
Or a total of				5,574 acres

During the season just finished there have been cut and delivered to the Amatikulu Mill the following acreages of sugar cane, *viz.*:—

From 1st class farms	...	...	...	1,116 acres
From 2nd class farms	...	...	..	330 acres
From 3rd class farms	...	...	...	20 acres
—a total of				1,466 acres

The tonnage of cane received from the respective classes of farms was as follows:—

From 1st class farms	36,449 tons	= 32.6 tons of cane per acre
From 2nd class farms	4,459 tons	= 13.5 tons of cane per acre
From 3rd class farms	292 tons	= 14.6 tons of cane per acre
Total	...	41,200 tons

Thus the average yield of cane received over all the farms will be found to be about 28 tons to the acre.

Of the 41,200 tons of cane reaped this last season, 23,705 were conveyed by the Natal Government Railways, and 17,495 tons were conveyed by mule wagons or narrow-gauge tramway lines.

From returns received from the various planters, Mr. Warner has ascertained that there will be nearly 2,800 acres of cane to come off the land next crop; and this season showing so far every indication of a very favourable growth, the returns should yield an average of at least 30 tons of cane to the acre. Thus it will be seen that there should be something approaching 84,000 tons of cane for the season's crushing of 1909.

The highest yield of cane was found to be 60 tons, and the lowest 6·7 tons per acre.

All the canes, with but very few exceptions, were found to be very good and yielded a fair percentage of sugar.

After all, the man is the main factor in the profit of the hog business. Fair stock and a good man will show better profits than good stock and a fair man.

The method of producing tobacco under shade originated in Florida about 1896. The adoption of artificial shade was slow, and much labour and expense was incurred in experiments. In a few years, however, the tobacco produced by this method began to take its place in the trade among the higher class of goods and a demand was created for it. Much attention has been given to the production of tobacco under shade, and a useful bulletin recently issued by the United States Bureau of Plant Industry (Bul. 138) gives some valuable information for the production of wrapper tobacco under shade. It appears that, at first, loss was incurred by farmers in growing tobacco in this way, but from the results of actual experiments in this bulletin it is evident that tobacco can be produced profitably in the Connecticut Valley under shade, provided the growers will obtain a good strain of seed and start upon a small scale until he gets some experience in growing and handling the crop. It is stated that the best cloth to use for shade is one with twelve hard twisted threads to the inch. Also, in order to ensure an abundance of good, healthy plants, the seeds should be sterilised.

PLATE I.



POTATO LEAF BLIGHT.



POTATO MURRAIN.

Some Notes on the Diseases of the Potato Crop in Natal.

By ALBERT KELLY, F.E.S., Assistant Entomologist.

SOME little time ago a circular letter was addressed to numerous farmers with a view to ascertaining the status of that disease recently brought into such unenviable prominence under the name of White Rot.

The replies received thereto indicated very clearly that the majority of potato-growers are unacquainted with the various diseases, and have some difficulty in differentiating one from another. Further, the contributing causes appear to be very imperfectly understood, as are the methods of prevention and control.

Because of this it is thought that a brief descriptive account of the several troubles apt to be met with in raising potatoes, together with a few notes on the treatment of the same, would prove acceptable.

POTATO LEAF BLIGHT.

Alternaria solani.

The disease most generally prevalent in Natal is undoubtedly the Leaf Blight of the potato, caused by the fungus *Alternaria solani* attacking the leaves and sometimes the stems of its host, but, in contradistinction to the Potato Murrain, never affecting the tubers.

The malady first makes its appearance in the form of small, circular, brown spots; and these, enlarging from the centre outwards as the roots of the parasite grow away from the point of infection, may embrace much of the leaf surface of the plant.

A careful examination of these diseased spots shows them to be marked by concentric rings, and this peculiarity will help one in distinguishing it from the Potato Murrain, with which it may sometimes be confused. The spots are generally most numerous at the points of least vitality, *i.e.*, the tips and margins of the leaves; and, despite the fact that the parasite can of itself invade a healthy tissue, it has been observed that it immediately takes advantage of any weak spots, such as are afforded by the mutilation of the leaves by hail, insect bites, punctures, etc. The affected tissue dries out, becoming brittle and shrivelled, and the tips of the leaves may become very much curled.

This wholesale destruction of the leaves, *i.e.*, the lungs and stomach of the plant, is synchronous with the cessation of the plant's growth, and the size of the tubers from affected plants will be more or less regulated by the age and growth of the foliage of the parent plant when it succumbs to the fungus.

Treatment.

When dealing with this, as with most fungus diseases, it must be recognised at the outset that their prevention is better than their cure. Regular and thorough sprayings with Bordeaux Mixture (see Appendix A.) at intervals of fourteen days, and commencing directly after the blossoms appear [when the plant is beginning to be drained by the formation of the tubers] will secure comparative immunity from the blight; or, if already present, keep it well under control.

It may be pointed out that such a treatment, apart from its fungicidal action, will increase the output of the crop by reason of its stimulating action. Paul and Kruger found, on using a two per cent. copper sulphate and lime mixture, in which the former is known to be the potent constituent, that: "The potato leaves were stronger, their chlorophyll contents greater, their powers of assimilation and transpiration increased, the life of the leaf was lengthened, and the yield and starch contents of the tuber was increased."

It has been stated that potatoes grown on light, sandy soils are particularly susceptible to Leaf Blight, and that hot, dry weather, followed by a moister period, are conditions specially favouring the development of the disease, the first condition lowering the vitality of the plant and so rendering it more susceptible to the inroads of the parasite, whilst the second furnishes ideal conditions for the growth and spread of the latter.

POTATO SCAB.

Oospora scabies.

This disease is not considered as deteriorating the culinary quality of the potato, but quantitatively it produces a loss, as well as rendering the potatoes so unsightly as to very much affect the market value of the crop.

The tubers become covered with rough, scabby spots or pits, which may be few in number or so numerous as to almost cover the surface of the tuber. At those spots where the scabs exist there is an abnormal production of cork tissue which generally commences from the lenticels of the periderm, and this scurfy appearance of the potato is said to be brought about by the combined effects of the fungus and the attempt of the tuber to withstand its attack.

Treatment.

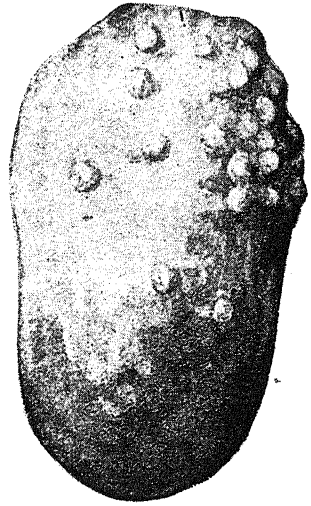
Prevention or control should aim at keeping the soil free from the fungus, the disinfecting of all seed before planting, and the selection of resistant varieties.

Once the disease is introduced into the soil the treatment of the seed is practically useless, as the fungus may exist in the soil, even if free from any root crop or kept under bare fallow for as long as six years, and no

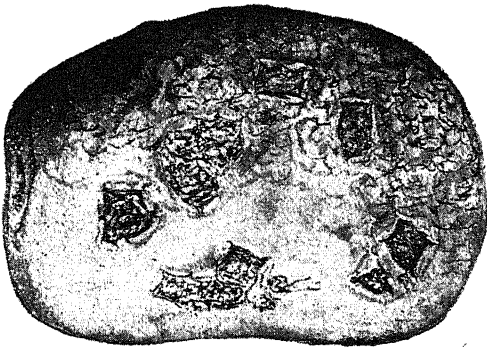
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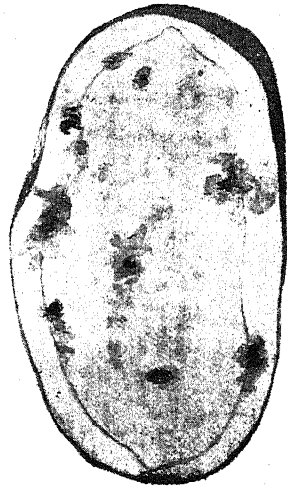
LAST STAGE POTATO MURRAIN.



GALLWORM ATTACK.



POTATO SCAB.



TUBER SHOWING BROWN
DISCOLOURATION.

practical treatment can be devised to render the seed *immune*, nor to disinfect the soil.

Generally speaking, in making use of scab-infested land, a root crop should be avoided, as beets, and possibly turnips, cabbages and radishes are liable to infestation; the better plan is to devote such to mealies, or crop of a similar nature, opening up new ground for the potatoes. This system of crop rotation is, moreover, a good farming principle.

Where seed is affected with scab it may be planted with perfect safety after dipping in formalin or corrosive sublimate, the former for preference, as being less dangerous and just as efficient. American experiments go to prove that whilst formalin if anything stimulates the germination of the seed, the use of corrosive sublimate resulted in its retardation. The University of Vermont has devoted a great deal of time to experiments in connection with the control of diseases of the potato, and in the seventeenth report of that institution, the results accruing from formalin gas fumigation are pronounced as even more favourable than those obtained by the dipping method. Fumigation is more adaptable to the seed dealer, however, and dipping is still to be commended for general farm practice.

The use of lime and ashes has been proved to have increased the percentage of scab. Acidity of the soil is not favourable to the development of scab, and it has been suggested that the planting and ploughing under of a green crop, such as clover, would be attended with good results; the attendant decomposition rendering the soil temporarily acid, and so tending to check the development of the scab fungus. Crops grown in sandy soil are more susceptible to the disease and a heavier loam should be chosen, if available.

Rough red coated varieties have been found to be generally much more resistant than the smoother and whiter skinned tuber, and much could be done, I think, in this matter of selecting seed for resistance to disease.

POTATO MURRAIN.

Phytophthora infestans.

Phytophthora infestans, the name given to the fungus causing the above disease, not only attacks the top of the plant, as does the Early Blight, but also seriously affects the tubers.

The scourge attained an unenviable notoriety during the years 1840-1845, and it was this disease which was responsible for the failure of the potato crop in Ireland at that time, and the consequent famine. It probably came originally from South America, the home of its host, and where it now grows on many wild plants of the potato family.

The first indication is the appearance of brownish spots, which rapidly grow darker and finally become blackish. The leaves become

crumpled and in a very short time from the first external appearance of the disease a field which promised to produce a splendid crop is reduced to a putrifying mass of plant debris, with a pronounced and characteristic foul odour.

The glistening white bloom to be observed on the under surface of affected leaves is the spore-bearing hyphae of the fungus. The spore cases which are borne thereon are blown by the wind, or distributed by rain, and other causes to non-infected plants, where they break, thus releasing the swimming spores of the fungus, which germinate and penetrate the tissue of the leaf, so creating fresh centres of infection.

These same spores are also responsible for the rotting of the tubers. "The spores are washed from the plant down along the stem and into the ground to the tubers. The swaying of the plants in the wind doubtless assists in this downward journey. Many are brought in direct contact with the tubers, and upon germination an entrance into the potato is effected. The normal white colour of the potato soon changes into a dirty brown as the result of its inroads. If the ground is dry and remains so for a considerable time 'dry rot' results, but if any considerable amount of moisture is present, the tubers decay rapidly, becoming nothing but a pulpy, ill-smelling mass. It progresses from the exterior towards the centre of the potato. It does not advance regularly, but may penetrate much more deeply in one part than another." (Hume.) It is possible that this latter condition may be considerably aided by the presence of bacteria and other fungi.

Treatment.

1. Control will aim at the planting of good, sound, reliable seed, and the discarding of all tubers showing the slightest signs of decay.

2. Spraying with Bordeaux Mixture, at intervals of ten days, as a preventative, commencing, say, six weeks from the date of planting. This treatment also has a direct effect upon the rot of the tuber, the output of sound tubers being sometimes brought up to over 200 per cent. over unsprayed plots.

3. All stems, leaves, etc., left after the crop is harvested should be gathered and *burnt*. The placing of these on the manure pile is not to be countenanced. Clean culture is to be regarded as the most important measure in the control of the insects and diseases affecting farm crops, and where propagating beds, in the shape of the remains of the previous crops, are allowed to lie in the fields undisturbed until the next planting season it is not reasonable to hope for a clean crop.

4. Something should be done in the matter of seed selection. Stuart, in Bulletin 112 of the Vermont Agricultural Experiment Station, states:

"In general, varieties having a strong, woody, moderately branched, upright haulm, and medium sized, rather thick, more or less crumpled, firm, hairy leaves were found more resistant to disease, especially Late-

Blight (Potato Murrain) than those possessing rather weak, partially woody, much branched, decumbent haulms, with rather large, thin, smoothish, soft leaves. In brief, varieties having an upright habit of growth moderately branched, with firm, hairy, medium sized leaves are much more likely to prove resistant to Late Blight (Murrain) than are those with large, smooth, flabby leaves and decumbent stems."

Experiments carried out and detailed in the same Bulletin also went to show that the rot resistance of the Dutch and German varieties is decidedly superior to that of the others tested. While the English and Scotch varieties showed considerably more rot than the former, the amount was approximately only one half that found in the French and American varieties. It is quite possible that local conditions might not allow of exactly the same results being arrived at in Natal, and it may also be pointed out that, whilst resistance to disease is certainly important, commercial standards are based on prolificacy, appearance, and edibility, in which virtues the German and Dutch varieties are not generally prominent.

WET OR BROWN ROT.

Bacillus solanacearum.

This disease differs from those previously dealt with, inasmuch that the causative agent is a bacillus and not a fungus. The following short description may assist in its recognition:—

The first external indication of the disease is a sudden wilting of the foliage, followed by a shrivelling of the stem, which changes from its normal bright green colour to a muddy green, and finally to brown and black. "If a section of a diseased stem be examined, the diseased areas, in the form of dark spots arranged somewhat in a circle about, and some distance apart from the centre may be readily observed." (Hume.)

Like the Murrain, the tubers are not exempt and, with the attack of the bacillus a Brown or Wet Rot ensues, the infection taking place through the stem. The disease is not contagious by contact, but may easily be inoculated into a healthy plant. It will be appreciated, therefore, that insects play a most important part in its dissemination, and the infection of crops growing in newly opened soil is easily accounted for. As the bacillus probably lives over winter in the earth of potato and tomato fields, infected land should be devoted to some crop immune to the attack of the organism.

Preventive measures will, therefore, consist in:—

1. The planting of clean seed only.
2. The removal and burning of all infected plants directly they show any signs of the disease; and
3. The immediate digging of the crop, should the disease manifest itself to any degree, in order to save the tubers from the resulting rot.

In America the Colorado beetle is the main factor in the spread of the disease, and the destruction of these constitutes the first and most important recommendation for the control of the disease.

Here in Natal, however, we have no insects attacking the potato plants in any numbers, save, perhaps, occasional damage by epilachnids, and unless these are present in numbers it is hardly practicable to recommend the spraying of a large area of potatoes to guard against the dissemination of the disease by an occasional grasshopper or caterpillar. Where the crop is being sprayed against blight, however, 1 lb. of arsenite of lead added to every 50 gallons of the Bordeaux Mixture will prove an efficient safeguard, and is worth adopting.

WHITE ROT OF THE POTATO.

Nectaria solani.

Local growers should be well acquainted with the above disease, the introduction into the Transvaal of all tubers showing its presence being guarded against by a regulation which has provided a good deal of food for thought to many of our potato growers.

My figures illustrate the general appearance of the disease, the white tufts being the fruiting bodies of the fungus.

It has been definitely stated that the fungus is to be regarded as an active parasite, and it is apparent, therefore, that only seed free from its presence should be planted. Mechanical injuries, however, such as are likely to be inflicted when the crop is being lifted are convenient places of entry for the fungus, and care should be taken to avoid these. In sending consignments to the Transvaal, whether intended as seed or for the table, care should be exercised in separating out all tubers affected with White Rot.

Control measures consist in:—

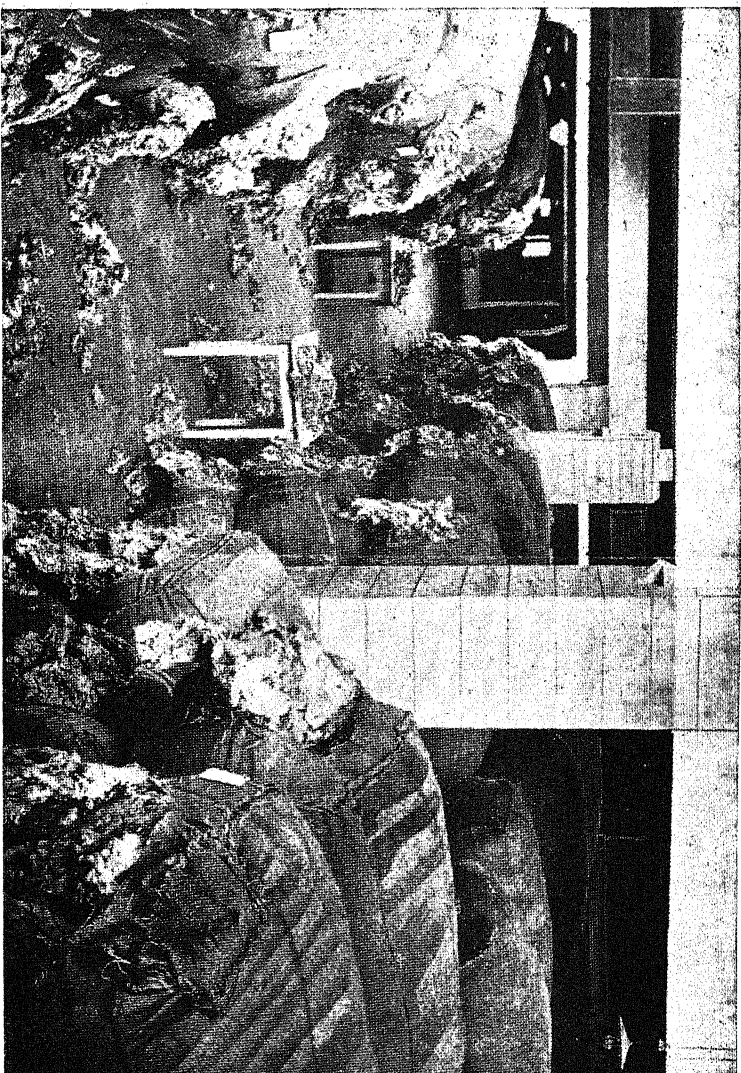
1. The use of clean seed;
2. The avoidance of land infested with the fungus; and,
3. The storage of the crop in well ventilated, dry stores.

THE POTATO MOTH.

Gelechia solanella.

This insect affects the leaves, haulm and tubers of the potato plant, but for practical purposes, at least in Natal, it may be set down as a tuber trouble, the bulk of the damage being done whilst the potatoes are in store.

The life cycle of the insect begins with the depositing of a very small egg by the small, brownish moth shown in Figure 3, Plate II. This is generally laid upon the skin of the tuber and in close proximity to the eyes, and may be deposited whilst the tuber is still growing in the field. The egg may also be laid on the tops of the potato, but generally not to



SOUTH AFRICAN WOOL AT AMSTERDAM.

Stored in one of the "Vriesseveen" Warehouses.

(From "South African Products for North and Central Europe.")

any appreciable extent, although instances have been brought to notice where not a little damage was done to the potato above ground.

In due course the egg hatches and the young caterpillar at once makes its way into the tissues. After feeding for eight or nine weeks, during which time the insect is, of course, secure from any practical treatment, it leaves its host and seeks a suitable place in which to pupate. The small silken cocoons may consequently be found attached to the bags, boxes, or walls of the store-room. Mayhap the ground even will satisfy the not over fastidious caterpillar, or, as is very often the case, some depression in the tuber itself will meet with its requirements. About 14 days is passed in the pupa stage, and, on the expiration of that period, the small brownish moth emerges. After pairing, the female is ready to fulfil her only mission, *i.e.*, the perpetuation of its kind, and in the execution of which our interests are incidentally affected.

It is seen that the only vulnerable stages in which we can attack the pest with any hope of success is when the egg is deposited on the tuber, and when the caterpillar leaves its habitat to pupate. The first phase is easily met with, in the case of stored potatoes, by steeping in a solution of 1 ounce of corrosive sublimate to seven gallons of water which will poison the caterpillars on their emergence from the egg. The moths and pupæ may be destroyed by fumigating the barrels, cribs, or store-room with carbon bisulphide, 20 fluid ounces of the chemical being employed to every 1,000 cubic feet of air space involved. Four or five applications should be made, at intervals of a fortnight, and, having regard to the heavy nature of the fumes, the chemical should be placed on top of the tubers. It should be borne in mind that the degree of success attending the fumigation will be governed by the length of time the fumes are contained in the building, and every effort should be made to make this gas-tight. The fumes are highly inflammable, and naked lights should not be used during the operation.

All other efforts must be directed towards the prevention of attack.

Whether for storing or planting, the tubers should be carefully sorted over, and any showing signs of attack rejected and destroyed.

As infestation is likely to be effected in the fields, thorough cultivation and careful hilling, so that the tubers are not exposed to the approach of the moth through fissures in the soil, is recommended.

The greatest attention should be paid to the room in which the potatoes are being stored, as it is here that most of the damage originates. It should be made thoroughly moth-proof; and, when it is desired, retentive of the fumes of carbon bisulphide. The windows, ventilators, and any other open spaces should be covered with fine netting, and the door and other openings should fit tightly so that no gaping cracks are presented, and through which the moth might gain an entrance.

Of course, were the broods of this insect regular, not so much diffi-

culty would be experienced in its treatment, but overlapping, as they do, much patience has to be exercised in any efforts having for their object the eradication of this insect from the farm buildings.

The application of any of the above recommendations will, however, do much towards minimising the damage done by the pest.

GALL WORM.

Or Nematode Attack.

The presence of gall worm is revealed by the sometimes numerous round swellings on the surface of the tuber, which may, perhaps, best be described as warts. On cutting a very thin section of one of these galls, and placing it on a glass slide with a drop of water, numerous white spots may be observed embedded in the tissue, and these are the female nematodes greatly swollen by reason of the vast quantity of eggs contained within their bodies.

Treatment.

These root or gall worms are parasitic on a very great number of our cultivated crops, as well as fruit trees, but, whilst particularly favouring root crops, they do not particularly thrive on cereals. The planting of these is, therefore, recommended on infested lands, or the nematodes may be starved out by allowing such to lie under bare fallow for a couple of seasons.

A system of trapping the worms by means of catch crops has been employed in Germany, where gall worms at one time seriously threatened the beet sugar industry, with the greatest success.

The fact that the worms took some five or six weeks from the date of entering the beetroot to reach maturity—on attaining which they leave their host and escape into the soil—suggested the planting out of catch crops which could be pulled up and destroyed four weeks from the date of planting, or two weeks too early from the nematode's point of view. In Germany, however, beetroot is grown in connection with the sugar industry, and the crop could not, therefore, be replaced. In Natal, where non-favouring crops are readily available and may be substituted without inconvenience, the complete and immediate ridding of the soil is, generally speaking, not so very necessary.

CONCLUSION.

It must not be thought from the above notes that the growing of potatoes in Natal is to be regarded as a perilous undertaking; indeed, we are much more fortunate here in respect to the fungus diseases and insects affecting the crop than many other countries. With the exception of Leaf Blight but little damage is done, loss resulting from the attack of Murrain seldom being reported. Loss from White and Wet Rots is very often traceable to damage sustained whilst lifting the crop and the subsequent careless storage of the tubers.

A CRUMB OF COMFORT.

"As there were times when insects and fungi did little or no injury, so also will there be times when the same state of affairs will again exist. This will be when farmers have, by a few years' conscientious and *united* use of insecticides and fungicides, so near freed their orchards and vineyards" (and farm crops) "that a small amount of work each year will serve to protect their increase and spread, except under abnormal conditions."

Appendix A.

BORDEAUX MIXTURE.

Bluestone, or Copper Sulphate	6 pounds.
Stone Lime (Imported)	6 pounds.
Water	50 gallons.

To prepare, take two 25-gallon barrels. Fill one with water and dissolve the copper sulphate in it. This is best done by suspending it in a cloth bag in the water overnight. Slake the lime in the other barrel, so that it forms a thin paste (start slaking in hot water) and fill barrel. To mix, take two equal sized wooden buckets, and dip a bucketful from each barrel and pour simultaneously into the third barrel, or the spray pump tank, taking care that the two liquids flow together in one stream. If the barrels are elevated the liquids may be drawn off simultaneously into the third by equal sized hoses.

NOTE.—On no account should "Agricultural" bluestone or unslaked lime be employed. Test by dipping a bright steel knife in the solution for a minute or so, and if this is discoloured coppery, more milk or lime must be added.

Appendix B.

CORROSIVE SUBLIMATE.

Corrosive Sublimate	2 ounces.
Water	15 gallons.

Dissolve poison in two gallons of boiling water, and dilute to full quantity of water. Put potatoes in sacks and soak for $1\frac{1}{2}$ hours in solution. Wooden vessels should be used, and the tubers should be treated two or three weeks before planting.

APPENDIX C.

Formalin	1 pint.
Water	38 gallons.

The potatoes may be soaked in this solution for two hours, then spread out to dry, and may be planted immediately after treatment.

Dipping and Tick-Destroying Agents.

REPORT BY H. WATKINS-PITCHFORD, F.R.C.V.S., F.R.S.E.

THE following report upon the efficacy of dipping and tick-destroying agents in general and upon the composition of one in particular, has been submitted to the Minister of Agriculture by the Government Bacteriologist:—

The report is intended to show the efficacy of certain preparations intended for the dipping and spraying of cattle. The main object with which this enquiry was instituted was the ascertainment of the frequency with which such dipping agents could be used without risk or disability to the animals concerned.

Such safety in use, however, was deemed of importance only when conjoined with the ability of the agent under observation to destroy the tick.

The conclusions arrived at, therefore, must be clearly understood to be based, not only upon the reliability of an agent as a dip for general use at usual intervals, but chiefly upon its ability to permit re-application at a short interval without incurring damage to the animal system.

Most of the current cattle dips have come under review in this manner, and an endeavour has been made to compare the properties of these preparations under conditions as similar as possible.

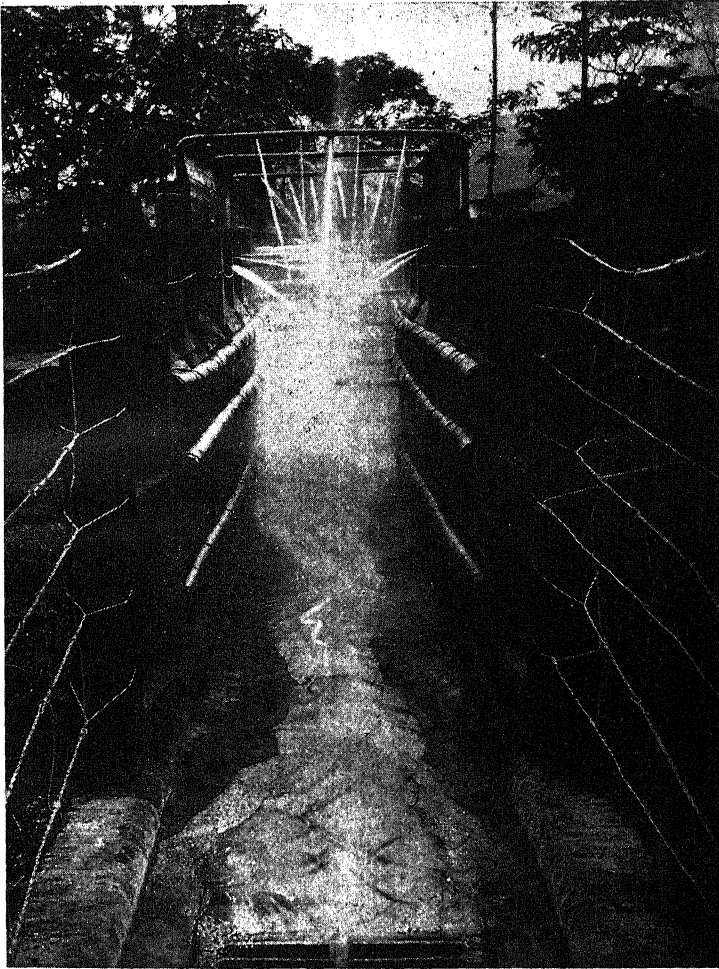
Precise similarity of conditions of test have not been possible, inasmuch as the observations undertaken have extended over some period, during which the conditions of weather, intensity of tick infestation, etc., have varied, but such slight variations have not in my opinion influenced final results in any great degree.

The agents coming under observation have been as follows:—

- | | |
|--------------------------------|-----------------------------|
| 1. Cooper's "Tixol"; | 8. Holmes' Paste Dip; |
| 2. McDougall's Dip; | 9. "Ialine" Sheep Dip; |
| 3. Quibell's Dip; | 10. Electrolysed Sea-water; |
| 4. Cooper's Powder Dip; | 11. Arsenite of Soda; |
| 5. Demuth's Dip; | 12. Erkenbrach's Paste Dip; |
| 6. Newton Chambers "Izo-Izal"; | 13. Alderson's Dip; |
| 7. Thomas' Dip; | 14. "Laboratory Dip." |

It will be seen from the attached schedules that most of these preparations were efficient tick killers, some of them acting efficiently in this respect when used in much higher dilutions than those recommended in the directions recommended accompanying the sample.

In view of the number of dipping agents to be enquired into at one



THE "NATAL" SPRAY PEN.

(See Report on Dips and Dipping.)

time it was found impossible to construct for every such preparation a dip or receptacle in which complete submersion could be effected, especially as each preparation was examined in three separate dilutions, full strength (as recommended by the proprietors), three-quarters strength, and half-strength, as it was hoped that some of the dips under enquiry—even if too strong to bear frequent repetition in full strength—might give good results when used at less than the strength prescribed for ordinary long interval dipping. This arrangement, as will be seen, necessitated the use of a large number of different solutions for which tank accommodation was out of the question.

It was, therefore, decided to base the enquiry primarily upon each preparation when used in the form of a spray, as such spray solution could be freshly mixed in the quantity required, and so effect a saving of both time and material.

It was recognised, however, that the results derived from the use of a solution in spray form were not strictly comparable to the results given by a dip or bath in which complete submersion took place.

As, however, it has been frequently observed that the effect of a spraying fluid is increased or intensified when used in the form of a dip, no objection to the preliminary use of the spray—on the ground of severity of effect—could be brought forward. A preparation, therefore, which was found too strong to bear repeated application in the form of a spray was considered to be unsuitable for use when used at the same intervals of time in the form of a dip or bath.

This observation as to the difference of effect between the same fluid in the form of a spray and a dip has, I believe, been the experience of others who have conducted investigations upon the effect of such preparations in other parts of South Africa. In carrying out an exhaustive examination of the matter much difficulty has been experienced by reason of:—

- (a) The restriction of grazing on account of existing East Coast Fever quarantine regulations; and
- (b) The difficulty of obtaining and transporting to the Laboratory paddocks a number of cattle sufficient for the purpose of the enquiry, which difficulty arose also upon the same ground.

The maintaining of an adequate degree of tick infestation—in order to judge of the effect of the various preparations upon tick-infested cattle—was only effected with much difficulty by reason of the restrictions of the animals to small paddocks, which later rapidly became both eaten down and denuded of ticks by the frequent dippings to which the contained cattle were subjected. In order to meet this difficulty the Corporation of Pietermaritzburg was approached and was good enough to at

once place at disposal some acres of the Town Lands contiguous to the Laboratory paddocks. Even with this advantage the difficulty has been considerable of re-infecting the test animals with a sufficient number of ticks to judge of the action of the various dipping preparations. The artificial hatching of ticks has, therefore, been resorted to, but such expedient—by reason of the delay and trouble involved—has not given the satisfactory results which would have attended the natural infestation of cattle grazing in an unrestricted area. In spite of this difficulty, the results obtained were sufficiently conclusive in each case as to the tick-killing properties or otherwise of the preparations concerned.

Observations as to the safety of an application and the interval at which it could be repeated without danger presented no difficulty, but much time has been spent in making such observations and in recapitulating such results as seemed unusual or unexpected.

In the first instance six head of cattle were set aside for the investigation of each preparation (although in some instances of repetition of results as many as twenty or more animals have been required for a single dip), and these six were apportioned as shown in the tabular statements, viz., two beasts for the full strength, two for the three-quarter, and two for the half strength solutions. In this way it has been possible to note the tick-killing properties of a dip and also the safety with which a certain dilution could be repeated at a short interval.

This question of interval between dippings has been considered of much importance in view of the life history of the tick, especially of the Brown tick (*Rhipicophalus appendiculatus*), so frequently responsible in in one of its developmental stages for the transmission of East Coast Fever.

The interval, therefore, between application of the various solutions was made as short as possible in order to prevent the tick in question surviving and thus leaving the body of an infected host and further propagating the disease.

A dip which could be applied so frequently as to ensure the destruction upon a beast of all forms of tick life would obviously do much to limit the spread of the disease by reducing the number of pathogenic or disease-producing ticks and thus decreasing the chances of infection.

The problem of killing all parasites upon a beast every few days without involving the beast itself in danger by direct or cumulative effect of the repeated applications proved a somewhat difficult question, and it was upon this point of the interval at which applications could be repeated with safety that most of the preparations under review were found wanting.

Arsenic—the chief constituent upon which most of the dips depend for their killing or insecticide properties—is a strong irritant to the skin, and in addition is capable of occasionally storing up or accumulating

its poisonous properties and suddenly exerting such in the form of acute arsenical poisoning.

Too frequent application of such a fluid gives rise to an inflammation of the skin, showing itself by a "staring" of the coat, and a heat and soreness of the skin itself, which latter frequently becomes wrinkled in lines or cracked so deeply as to permit the oozing of blood and fluid from the fissures.

As the skin at the back of the knee-joint and front of the hock is generally involved great reluctance to move is noticed, and the pain and discomfort are frequently so great that the beast will lie down and die without making an effort in extreme cases to help itself. Wherever a note exists in the following schedules as to "cracking" or "peeling" it will be understood that the effect has been due chiefly or solely to the dip in question containing too high a percentage of arsenic, or to the form in which the arsenic has been combined with the other component parts of the dip. At the foot of each schedule will be found a brief resume of its contents, and, in looking through these, it will be noticed that, while some preparations are shown as being inefficient as regards their tick-killing properties, the majority are found to be so severe as to necessitate the discontinuance of the test by reason of the effect upon the system of the animal.

The necessity mentioned above for frequent cleansing of animals at short intervals led to the interval of four clear days, *i.e.*, every fifth day, being determined upon as the shortest practicable time to which such interval could be brought with due regard to the safety of the beast and the destruction of ticks. This minimum time—four clear days—was found to be too severe a test for the majority of the preparations under examination to conform to, which preparations—though they proved quite efficient in tick-killing power—produced such grave local and constitutional disturbances as to necessitate their discontinuance after a few applications.

The difficulty of finding on the market a composition capable of wholly satisfying the above requirements led to the attempt to produce one, and as an outcome the dip referred to as "Laboratory Dip" in the schedule has received an extensive trial, and its composition will be found attached in the form of an Appendix, "A" After the component parts of this latter of Laboratory preparation had been successfully adjusted so as to give the desired result when used as a spray (see Schedule 15), it was found to be too strong used in 2,000 gallon bulk as a dip in which animals were completely immersed (see Schedule 19).

Further adjustments were therefore made (chiefly by alteration of the arsenical contents) and the final result is that shown on Schedule 21, in which it will be noticed that cattle have been put through this mixture

for sixty days at regular intervals of four clear days, and, while the cattle maintain their usual health, the ticks are destroyed.

The same fluid after two months' use when applied to grossly infested cattle in the form of a spray cleans them satisfactorily. It will, therefore, be seen that it is possible to dip cattle at such short intervals as once every fifth day without detriment to the beasts so dipped, and they can in this manner be kept practically free from tick infestation such as occurs in the short intervals between dippings. Even during such interval the dip has been noticed to exert to some extent a deterrent effect upon re-infestation (although on this point the difficulty mentioned above of securing thorough infestation by ticks under the conditions existing must be considered).

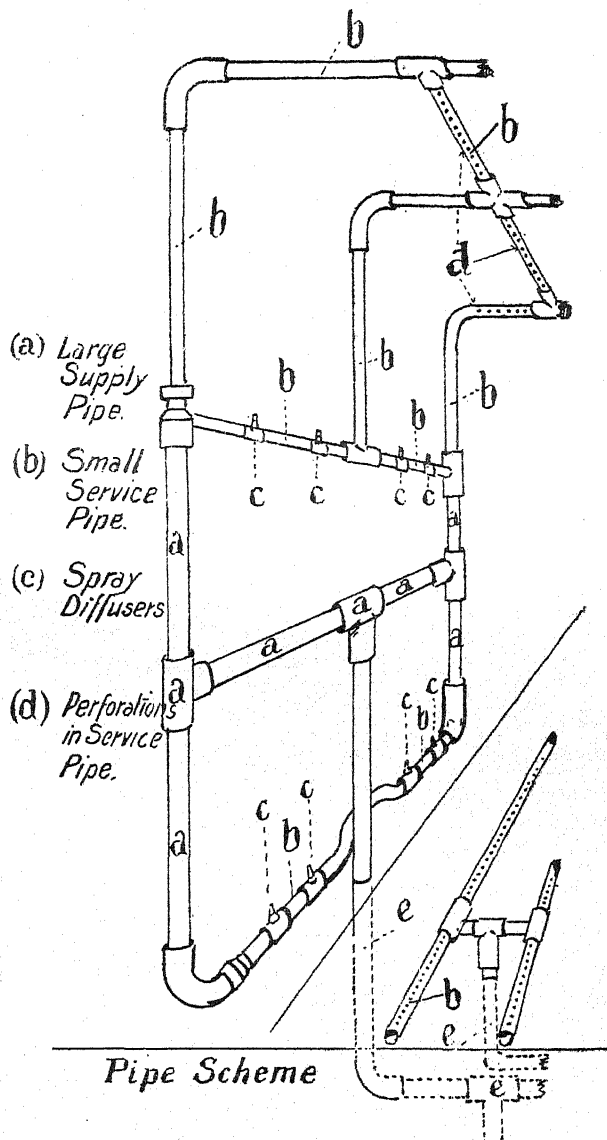
As far as I have been able to judge, cattle can be worked with safety directly after dipping in this "Laboratory Dip" when applied every fifth day. My opportunities of observing this point have been limited, but with a span of six oxen which have been repeatedly yoked as soon as dry after dipping and used for ploughing in heavy ground, no unfavourable results have ensued although such work has been continued day by day throughout the intervals from one dipping to another.

The question of ability to work after such frequent dippings is an important one to the owner of transport cattle or working oxen, and when the difficulties of safe and efficient dipping at short intervals have been met there remains the above difficulty of ensuring that no effects are produced preventing the animals so dipped from performing ordinary labour.

In one of the preparations shown amongst the annexed schedules a satisfactory result was given by the dip in question for many weeks, but when the oxen came to be worked it was found necessary to greatly increase the interval between dipping in order to avoid the risk of collapse and even death ensuing.

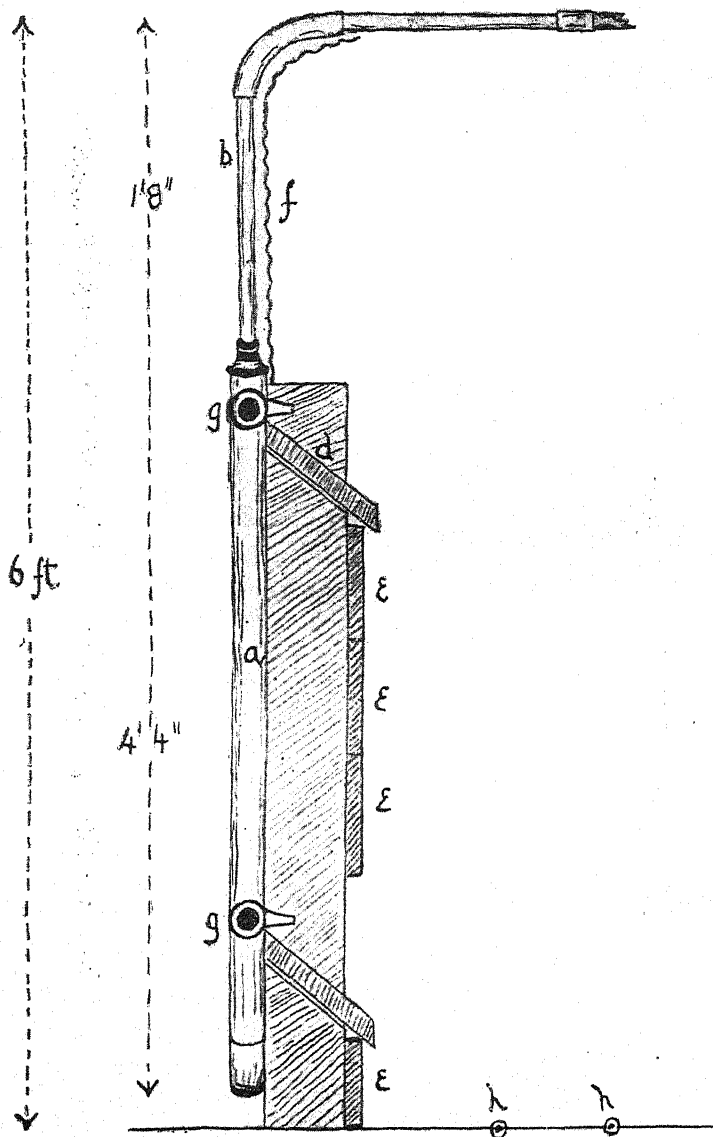
The only dip besides the Laboratory Dip which has been brought to my notice as being capable of frequent, safe and satisfactory application even to working oxen is that in use at present upon the Nel's Rust Estate. Immersion in this dip takes place every seven days with cows and working oxen alike, and I am informed the cattle are kept virtually free from ticks and are capable of performing their usual work without distress.

This Nel's Rust dipping fluid is a modification of the Queensland dipping formula, and a copy of the formula used at Nel's Rust, which was given to me through the kindness of Mr. Alexander, is shown in Appendix "B" for the use of those who consider a weekly immersion a sufficiently short interval between dippings. Another practice in use at Nel's Rust is the separate dressing of the ears of all beasts either when emerging from the dip or in the yoke. It has frequently been observed in the course of this enquiry that cattle will become divested of all their



NATAL SPRAY PEN.

PIPE SCHEME.



NATAL SPRAY PEN.

ONE OF THE SUPPLY PIPES.

- | | |
|--------------------------------------|----------------------------|
| (a) 2-in. Supply Pipe. | (b) 1-in. Piping. |
| (c) Post. | (d) Drip-boards. |
| (e) Longitudinal Boards. | (f) Section of Sheet Iron. |
| (g) Spray Diffusers on 1-in. Piping. | (h) Floor Pipes—1-in. |

ticks with the exception of a few (generally Brown ticks) which persist in the ears, usually upon its edge or fringe. The practice, therefore, of applying a special dressing to the ear by means of a swab gives good results in those cases where the dip fails to kill all ticks, and the same procedure holds good in those cases where ticks are found to survive under the root of the tail. I am informed that at Nel's Rust where this procedure is systematically adopted the results leave nothing to be desired, while the trouble involved in this extra manipulation is only slight even where a large number of cattle is concerned.

It will be found, however, in the majority of cases where the Laboratory formula is employed that this separate treatment will not be found necessary, a fact probably owing to the higher percentage of arsenic present.

In order to facilitate the treatment of small numbers of cattle for which the cost of building and maintaining a dip might be considered prohibitive, an appliance has been devised for the mechanical application of the dipping fluid in the form of a spray. This device was described in the December number of the *Natal Agricultural Journal*.

As the advantages of a mechanical spray are obvious both from the point of view of economy of construction and working, I have shown details of the device in the accompanying illustrations. Where sufficient motive force is applied to the working of the pump the results obtained from the use of such an appliance are satisfactory in all respects, while the fluid used in the process of spraying is enabled to be constantly renewed so that a solution of standard strength is always available, an important point which the present dipping tank system frequently fails to ensure. Following will be found appended the various schedules showing the manner in which the different dipping agents have comported themselves in their various strengths at an interval between applications of four clear days in each case.

It will be seen that no attempt has been made to compare the cost of the various preparations or to judge of the same from any preferential standpoint. All that has been attempted has been to ascertain the tick-killing properties of the preparation in question and the safety with which applications of the same could be made.

No critical observations have been made as to the species of tick concerned in the foregoing tests, although the Brown tick has been the subject of special notice in computing the tick-killing properties of any dipping fluid.

Where actual numbers of ticks are mentioned as surviving, it will be understood that an approximation only is meant. Much time, however, has been spent at each inspection in order to make this number as correct as possible.

At the foot of each schedule will be found a summary of its results in application.

It will be seen that all animals do not become equally affected by equal exposure to the spray or dip, and several instances can be noticed in which it was found necessary to cast one of the animals from a test on account of the severe skin reaction, while the companion animal remained unaffected.

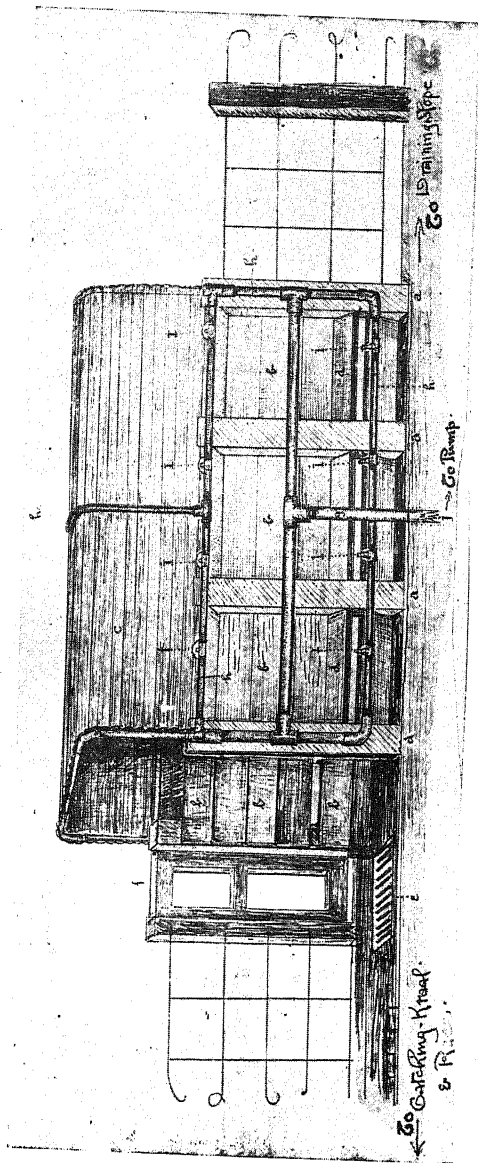
Such constitutional differences are, of course, to be expected. Another point of interest to be observed is the frequency with which a tolerance became established in beasts which threatened to develop inflammation of the skin after the third or fourth spraying or dipping, but which became habituated to the process by further repetition.

A slight amount of skin-irritation amongst a few animals after commencing the use of a fresh dip would not, therefore, appear to necessitate the immediate discontinuance of the use of a dipping fluid, but it is, of course, necessary to observe all such cases narrowly and to disuse any dip which threatens to exert its irritating effect to any serious extent.

The details given in Schedules 14 to 21 show the manner in which final results have been arrived at and the effect of the addition of various agents to the arsenical base, which latter, in the present state of our knowledge, must be looked upon as an essential constituent of all efficient dips for tick destruction.

The results given by the use of arsenite of soda alone will be found upon reference to Schedule 11, and the proportions shown there were taken as a rough index as to the arsenical content necessary in the preparation of a dip such as that shown in Schedules 14 to 21 ("Laboratory Dip"). Accordingly the full strength of one pound of arsenite of soda (containing about 80 per cent. of arsenic) to twenty gallons of a diluting fluid was used, and this diluting fluid was arranged to contain Soap (in order to emulsify the other constituents and to produce a more lasting effect upon the skin), Paraffin (to act as a penetrating and tick-destroying agent which might assist also by its odour in reducing liability to tick attack), and Glycerine (as an emollient tending to counteract the roughening and irritating effect both of the arsenic and paraffin and to maintain sleekness of coat).

The results obtained from this mixture will be found on reference to Schedule 14, from which it will be seen that, while the animals are efficiently cleaned from their ticks, constitutional symptoms begin to set in after from four to six applications of the spray (every five days), which necessitates the casting of the animals from the series. Accordingly on Schedule 15 it will be noticed that the arsenite of soda is reduced to three-quarters of the above quantity; only 12 ozs. to 20 galls. of other fluid being used. This appears efficacious and safe, and after twelve sprayings an attempt is made to reduce the interval to two clear days instead



SPRAY PEN.

- (a) Wooden Uprights (4 in. x 5 in. posts).
- (d) Drip Boards.
- (g) Large Supply Pipe.

(b) 1 in. Planks.

(e) Grating Covering Tank.

(h) Small Service Pipe

(c) Supply from Pump.

- (e) Hood of Corrugated Iron.
- (f) Through-way Gate.
- (i) Spray Diffusers.

(See Report on Dips and Dipping.)

of four, which is continued at this reduced interval for three sprayings, when symptoms of slight skin trouble necessitate return to the four clear day's interval, which is repeated with safety up to 23 operations before being discontinued as final. This experiment is repeated under letter "B" (Schedule 15) at a constant interval of four clear days with practically the same result up to 19 sprayings, covering a period from 28th August to 26th November. A recapitulation under letter "C" gives the same results up to 10 sprayings.

As will be seen from inspection of Schedule 15, a spraying fluid composed of the above constituents and containing in every 20 gallons 12 ounces of arsenite is both efficient and safe for use as a *spraying fluid* for an indefinite period.

An attempt was made to further reduce this amount of arsenite, keeping the other proportions as before, but the results were not so uniform although the cattle in the series were maintained practically free from ticks. (This schedule has not been put up from considerations of space.)

In view of the above results an endeavour was made to simplify the composition of the dip by omitting both the paraffin and glycerine, the soap emulsion remaining as before. Schedule 16 shows that the effect of the arsenic was too irritant even in the three-quarter strength, and that the animals had to be cast after the application of three sprayings. The addition of the glycerine to the composition used in Schedule 16 gives much the same result (as Schedule 17 shows), whereas the addition of the paraffin and the omission of the glycerine (Schedule 18) permits of the application of 11 sprayings before it is necessary to cast the animals. These results may, therefore, be summarised as follows:—

Arsenite (alone) 12 ounces to 20 gals. permits	...	3 sprayings
Arsenite, Soap emulsion ,, ,,	...	3 sprayings
Arsenite, Soap and Glycerine ,, ,,	...	3 sprayings
Arsenite, Soap and Paraffin ,, ,,	...	11 sprayings
Arsenite, Soap, Glycerine and Paraffin ,,	...	23 sprayings

Arsenite of soda, therefore, in proportions as shown combined with the materials given above is a safe and efficient agent for use as a spraying fluid repeated at intervals of four clear days.

An endeavour was then made to observe the effects of the above fluid in the form of a dip in which cattle could be completely submerged, and accordingly a dip of the ordinary pattern (about 3,000 gallons capacity) was filled with the composition as above, with the exception of the glycerine. (See Appendix "A.") Through this dip eight beasts were passed, as shown in Schedule 19, from which it will be seen they rapidly became unfit for further experiment.

As it was thought that this disappointing result might possibly have been due to the presence of un-emulsified paraffin which floated upon the top of the tank this oil was removed by skimming and water was added to the dip in order to bring the strength down to one pound of arsenite to forty gallons of fluid. The effect of this mixture is shown on Schedule 20, and eight beasts were passed through this fluid for four dippings before signs of skin-irritation began to manifest themselves. This difference of behaviour in the dipping fluid—even when less arsenite was present—seems strange, and I am not able to offer any satisfactory explanation of the fact, which, however, has been noted by other observers.

A further dilution of the whole dip was therefore decided upon, and sufficient water was added to bring the strength down to one pound of arsenite to forty-six gallons, and the results of this final adjustment are seen in Schedule 21. It will there be seen that 40 beasts have been passed through this solution without any sign of skin irritation and that they have been cleaned from their ticks and maintained in a condition of comparative freedom from tick-infestation. During this period—dating from 21st December to the end of February—they have been continuously exposed to such re-infestation by ticks as the somewhat denuded paddocks have afforded, and such ticks as have attached themselves to the cattle have been regularly destroyed. Numerous Brown ticks have existed during this time, and separate experiments have been made upon the ears by bagging, etc., in order to observe the effect of the immersion upon these ticks in particular; the question of survival after dipping being in this way differentiated from re-infestation.

The strength of the dipping fluid has been ascertained from time to time, both by estimation of the quantity of arsenic by analysis, and by the cleansing effect produced upon the small number of grossly-infested beasts kept apart from the general herd.

It will, therefore, be seen that the fluid which, for want of a better term, I have called the "Laboratory Dip," is capable of continued application at intervals of four clear days for an indefinite period, and that it has proved as far as could be judged an efficient tick-killing preparation.

As I have said before, however, the work has been conducted with several limitations which may possibly give rise to results somewhat divergent from the foregoing results when an extended use of the dip in various localities is made. Simple adjustment of detail without alteration of any important point will, however, suffice in any such cases to ensure good results.

Another point upon which further observation is desirable is the safety with which working cattle subjected to this dip can be used for draught purposes. This point can be decided only by further trials which I am now arranging to have carried out in different parts of the

Colony. It appears to me, however, that there is good reason to believe that cattle can be worked with impunity while undergoing regular dipping, and, I trust it may be found that the work undertaken in this direction will prove not only of use in retarding the spread of East Coast Fever but will prove of assistance in the general eradication of the tick itself.

H. WATKINS-PITCHFORD,

Govt. Bacteriologist.

The following are the schedules referred to in the foregoing report:—

Schedule No. 1.

COOPER'S "TIXOL."

FULL STRENGTH

(As directed to be used by the Manufacturers.)

First spraying, June 13th, 1908.—Both beasts moderately infested with ticks.

Second spraying, June 18th.—(1) Thirty adults, also many young alive; (2) Few young ticks present.

Third spraying, June 23rd.—No adult, large number of young dead.

Fourth spraying, June 28th.—Clean.

Fifth spraying, July 3rd.—(1) Few small ticks in ears, beasts purging; (2) Clean, skin cracked.

Sixth spraying, July 8th.—(1) Accidental death; (2) Clean, skin cracked.

Seventh spraying, July 13th.—(2) Few young ticks, badly cracked. Cast.

THREE-QUARTER STRENGTH.

First spraying, June 14th.—Moderately infested.

Second spraying, June 19th.—Two adult forms alive, also few young.

Third spraying, June 24th.—(1) Few small forms present, belly swollen; (2) clean.

Fourth spraying, June 29th.—(1)

THREE-QUARTER STRENGTH.

Continued.

Clean, grinding teeth; (2) clean, legs peeling.

Fifth spraying, July 4th.—(1) Clean, stiff hind legs; (2) clean, legs cracked.

Sixth spraying, July 8th.—(1) Stiff and lame, cast; (2) badly cracked, cast.

HALF STRENGTH.

First spraying, June 15th.—Moderately infested with ticks.

Second spraying, June 20th.—(1) Several adult, also young ticks alive; (2) few fresh crawling forms young ticks.

Third spraying, June 25th.—(1) Many adult and young ticks present; (2) practically clean.

Fourth spraying, June 30th.—(1) Few adult and young alive, many dead; (2) practically clean.

Fifth spraying, July 5th.—(1) Practically clean; (2) clean.

Sixth spraying, July 10th.—(1) Clean, slightly cracked; (2) clean.

Seventh spraying, July 15th.—Cracked and peeling, cast. Died on July 13th from the effects of spraying.

SUMMARY.

It is evident from the above schedule that this preparation is too severe in its effects when used every fifth day in its full strength. The effects begin to be pronounced after the application of the fourth spraying, and when the strength of the spray is reduced by one-quarter no great difference is observed. Even when used at half strength directed effects begin to be produced on the skin after the fourth spraying. It is obvious, therefore, that this preparation—while quite efficient as a tick-destroyer—is not capable of use even when diluted to half strength.

Schedule No. 4.

COOPER'S POWDER.

FULL STRENGTH.

(As directed to be used by the
Manufacturers.)

First spraying, June 13th, 1908.—Moderately infested.

Second spraying, June 18th. — Five adult and small number young ticks.

Third spraying, June 23rd. — Young ticks all dead, practically clean.

Fifth and sixth spraying, June 28th to July 8th.—Clean; (1), skin peeling.

Seventh spraying, July 13th. — (1) Clean, badly cracked, cast; (2), clean, badly cracked, cast.

THREE-QUARTER STRENGTH.

First spraying, June 14th, 1908.—Moderately infested.

Second spraying, June 19th.—(1) Few young ticks; (2) 18 adult and few young ticks.

Third spraying, June 24th.—(1) Practically clean; (2) 25 adult alive, many adult dead.

THREE-QUARTER STRENGTH.

Continued.

Fourth spraying, June 29th.—Clean.

Fifth spraying, July 4th.—Clean.

Sixth spraying, July 9th.—Clean.

Seventh spraying, July 14th.—(1) Skin cracked, cast; (2) skin cracked, cast, lachrymation.

HALF STRENGTH.

First spraying, June 15th, 1908.—Moderately infested.

Second spraying, June 20th.—(1) adult, large number young ticks; (2) 17 adult, large number young ticks.

Third spraying, June 25th.—(1) Adult dead, large number young alive; (2) body clean, large number young alive.

Fourth spraying, June 30th.—Clean.

Fifth spraying, July 5th.—Clean.

Sixth spraying, July 10th.—Small number young ticks.

Seventh spraying, July 15th.—Clean, skin roughened, cast.

SUMMARY.

The above table shows that this preparation is not capable of satisfying the demands of the enquiry in hand, inasmuch as the skin commences to be affected after the fourth spraying at ordinary strength, while when reduced to half strength only seven sprayings are tolerated before skin irritation is set up. It is probable, therefore, that in a form of a dip rather than as a spray the skin of these animals would have become affected at an even shorter interval.

This preparation appears to be highly efficient as a tick destroyer, but the interval at which it could be applied safely is probably a somewhat lengthy one.

Schedule No. 5.

DEMUTH DIP.

FULL STRENGTH

(As directed to be used by the
Manufacturers.)

First spraying, July 8th, 1908.—Moderately infested.

Second spraying, July 13th.—(1) Large number young ticks; (2) small number young ticks.

Third spraying, July 18th.—Majority of ticks dead.

Fourth spraying, July 23rd.—Practically clean, legs peeling.

FULL STRENGTH.—Continued.

Fifth spraying, July 28th.—Clean, skin cracked, cast.

THREE-QUARTER STRENGTH.

First spraying, July 9th.—(1) Fair number of ticks present; (2) large number of ticks of all ages.

Second spraying, July 4th.—(1) Few young ticks; (2) 12 adult alive; majority of ticks dead.

Third spraying, July 19th.—Clean, badly cracked, cast.

DEMUTH DIP.—*Continued.*

HALF STRENGTH.

First spraying, July 10th.—Moderately infested.

Second spraying, July 15th.—Practically clean.

Third spraying, July 20th.—Clean.

Fourth spraying, July 25th.—Re-infested with moderate number of ticks.

Fifth spraying, July 30th.—(1) Clean, skin cracked, cast; (2) clean.

Sixth spraying, August 4th.—(2) Clean.

Seventh to tenth spraying, August 9th to August 24th.—(2) Re-infested large number of young ticks.

Eleventh to twelfth spraying, August 29th to September 3rd.—Large number of adults present.

Thirteenth to sixteenth spraying, September 8th to September 23.—Practically clean.

SUMMARY.

It will be seen from the above that this dip is not able to withstand repeated application. It will be noticed that the skin commences to become affected after three sprayings at full strength, and even in three-quarter strength this dip is not tolerated any better. Reference to the schedule will show that at the dilution recommended by the proprietors the legs became affected when the beasts were brought up for their fourth spraying, and it became necessary to cast them from the series after the fourth spraying.

The same results attended the use of the three-quarter strength solution, while in half strength it was found necessary to cast one beast at the fourth spraying, although the companionesse No. 2, as will be seen, goes on to the sixteenth spraying, having apparently acquired a considerable degree of tolerance.

This dip—though an excellent tick-killer—is obviously unsuited for repeated application.

Schedule No. 6.

IZO-IZAL SHEEP DIP.

FULL STRENGTH.

(As directed to be used by the Manufacturers.)

First spraying, October 2nd, 1908.—Moderately infested.

Second spraying, October 7th.—Moderately infested, none dead.

Third spraying, October 12th.—Moderately infested, none dead.

Fourth spraying, October 17th.—Moderately infested, none dead.

Fifth spraying, October 22nd.—Moderately infested, none dead.

Sixth spraying, October 27th.—Moderately infested, none dead.

Seventh spraying, November 1st.—Large number larval and nymphal forms.

THREE-QUARTER STRENGTH.

First spraying, October 2nd, 1908.—Moderately infested.

Second spraying, October 7th.—Moderately infested, none dead.

Third spraying, October 12th.—Moderately infested, none dead.

Fourth spraying, October 17th.—Moderately infested, none dead.

Fifth spraying, October 22nd.—Moderately infested, none dead.

Sixth spraying, October 27th.—Large number of young ticks present.

Seventh spraying, November 1st.—Large number adult and young ticks.

SUMMARY.

As will be seen from the above schedule, this preparation fails to destroy ticks upon cattle when used in the dilution as suggested by the manufacturers, 1 part to 100 parts of water. No irritating effects were observed after seven sprayings, when, as the tick-killing property of the dip seemed to be insufficient, the observations were discontinued.

Schedule No. 7.

THOMAS'S DIP.

FULL STRENGTH.

(As directed to be used by the
Manufacturers.)

First spraying, September 23th, 1908.
—Fair number of adult ticks.
Second spraying, October 3rd.—Clean.
Third spraying, October 8th.—Clean.
Fourth spraying, October 13th.—Clean,
skin cracked, cast.

THREE-QUARTER STRENGTH.

First spraying, September 28th, 1908.
—Fairly infested.
Second spraying, October 3rd.—Practically clean.
Third spraying, October 8th.—Clean.
Fourth spraying, October 13th.—Clean.
Fifth spraying, October 18th.—Clean,
skin cracked, cast.

SUMMARY.

The above schedule clearly shows the unsuitability of this preparation for repeated use at short intervals. Its tick-killing properties are, however, obvious.

Schedule No. 8.

HOLMES' DIP.

FULL STRENGTH.

(As directed to be used by the
Manufacturers.)

First spraying, February 8th, 1909.—
Moderately infested with brown ticks.
Second spraying, February 13th.—

Many dead brown ticks, reinfested large
number brown ticks.

Third spraying, February 18th.—Majority brown forms dead.
Fourth spraying, February 23rd.—Clean.
Fifth spraying, February 28th.—Clean,

SUMMARY.

Owing to this preparation not coming under review until such time as observations upon other dips were almost complete it has not been found possible to give it the same extensive trial as that given to other preparations. It will be seen, however, from the short schedule above that this preparation appears to be efficient as regards its tick-killing property and capable of repetition for at least five sprayings; though it should be stated in this latter connection that the only cattle available for this test have been repeatedly dipped in Laboratory Dip, and may on this account have possessed a certain amount of tolerance to further skin-applications containing arsenic. Its efficacy as a tick-destroyer appears to be well established.

Schedule No. 9. "LALINE SHEEP DIP."

FULL STRENGTH.

(As directed.)

First spraying, January 25th, 1909.—
Numerous adult and young ticks present.

Second spraying, January 30th, 1909.—
Numerous adult and young ticks present; none dead.

Third spraying, February 4th, 1909.—
Numerous adult and young ticks present; none dead.

THREE-QUARTER STRENGTH.

First spraying, January 25th, 1909.—
Large number of adult and young ticks present.

Second spraying, January 30th, 1909.—
Large number of adult and young ticks present, none dead.

Third spraying, February 4th, 1909.—
Large number of adult and young ticks present, none dead.

SUMMARY.

This preparation did not appear to exert any poisonous influence upon the ticks when used at the strength recommended as no dead ticks were observed, and as the test cattle remained thickly infested after three sprayings observations on this dip were discontinued.

Schedule No. 10.

HYPO-CHLORITE OR ELECTROLYSED SEA WATER.

FULL STRENGTH.

First spraying, January 25th, 1909.—
Moderate number of ticks present.

Second spraying, January 30th, 1909.—
Large number of adults present, none dead.

Third spraying, February 4th, 1909.—
Large number of adults present, none dead.

THREE-QUARTER STRENGTH.

First spraying, January 25th, 1909.—
Large number of adult forms present.

Second spraying, January 30th, 1909.—
Large number of adult forms present, none dead.

Third spraying, February 4th, 1909.—
Large number of adult forms present, none dead.

SUMMARY.

This preparation proved, as will be seen from the above schedule, to be apparently unable to kill any ticks when used in the proportions directed, *viz.*, 1 part to 49 parts of water. The observations were discontinued after the third spraying.

Schedule No. 11. ARSENITE OF SODA.

1 lb to 20 gallons.

FULL STRENGTH.

First spraying, July 3rd, 1908.—
Beasts moderately infested.

Second spraying, July 8th, 1908.—(1)
No adult alive, large number young alive; (2) seven adult dead and adhering, few young alive.

Third spraying, July 13th, 1909.—
Practically clean.

Fourth and fifth spraying, July 18th and 23rd.—Practically clean, skin cracked, cast.

THREE-QUARTER STRENGTH.

First spraying, July 4th, 1908.—Mod-
erately infested.

Second spraying, July 9th, 1908.—
Practically clean.

Third spraying, July 14th, 1908.—
Practically clean.

Fourth spraying, July 19th, 1908.—
Clean, skin cracked, cast.

ARSENITE OF SODA.—*Continued.*

HALF STRENGTH.

First spraying, July 15th, 1908.—Moderately infested.	Fourth spraying, July 25th, 1908. — (1) Clean, legs cracked, cast; (2) clean.
Second spraying, July 10th, 1908. -- Practically clean, many lice present.	Sixth spraying, July 30th, 1908.—(2) Clean.
Third spraying, July 15th, 1908. — Practically clean, many lice present, lice still alive.	Seventh spraying, August 4th.—(2) Skin cracked, cast.

SUMMARY.

Inspection of the above schedule shows that this preparation is too irritant when used in the strength often prescribed, *viz.*, one pound to 20 gallons of water. As will be seen, the skin commences to become affected after the third spraying at full strength, while when used in the proportion of only one half-pound to 20 gallons, one of the test animals was cast after the fourth spraying and the remaining one after the sixth spraying.

This schedule is of interest as showing the influence of the arsenite of soda used alone in an un-combined state. Comparison between this table and Schedules Nos. 14 and 15 of "Laboratory Dip" will show the result of combining other agents with this arsenite of soda, which result in the reduction of its irritating properties without taking away from its efficacy as a tick-killer.

It is obvious that arsenite of soda by itself is not suited either in the form of a spray or a dip if application at short intervals is necessary.

Schedule No. 12.

ERKENBRACH'S CATTLE DIP.

(All the observations below are made upon "Full Strength.")

FIRST OBSERVATIONS.

First spraying, June 15th, 1908.—Cattle well infested.

Second spraying, June 20th.—Moderately infested.

3rd spraying, June 25th.—(1) Practically clean, coughing; (2) practically clean; trembling, sick.

Fourth spraying, June 30th.—(1) Clean, coughing; (2) clean, legs peeling.

Fifth spraying, June 5th.—(1) Clean, legs peeling; (2) clean, skin cracked, cast.

Sixth spraying, July 10th.—(1) Clean, badly cracked, cast.

SECOND OBSERVATIONS.

First spraying, January 25th, 1909.—Moderately infested.

Second spraying, January 30th.—Moderately infested; many dead.

Third Spraying, February 4th.—Moderately infested; skin peeling, cast.

THIRD OBSERVATIONS.

Four Beasts.

First spraying, February 15th, 1909. All beasts moderately infested with ticks.

Second spraying, February 20th.—Clean.

Third spraying, February 25th.—Nos. 1 and 2 clean; skin cracked, cast. Nos. 3 and 4 clean.

Fourth spraying, March 2nd.—No. 2 clean; skin peeling, cast.

SUMMARY.

The above schedule shows the repeated effect of spraying at intervals of five days. It will be observed that three separate observations have been attempted in the months of June, January and February, and in each case the result will be found the same, with the exception that the spraying fluid is apparently tolerated better during the dry weather. The results in every case have been severe, and in a number of cases not shown in the schedule in which the proprietor's instructions were misunderstood a slight increase in the strength of the spraying solution resulted in the deaths of several animals after the fourth or fifth spraying. Responsibility for this result, of course, does not rest with the dip itself, but it serves to show the result which may be brought about if this preparation is used in greater strength than that recommended.

It will be noticed that three-quarter strengths or half-strengths are not shown in the above schedule, which is due to the mistake—unfortunately occurring—tending to confuse the results. Such results, therefore, have not been included in the schedule.

Judging from the behaviour of this preparation (in its full or manufacturers' strength) and also in its dilutions in comparisons with other preparations of a somewhat arsenical content, I am of the opinion that this dip would be found too severe in its three-quarter strength, and it is doubtful whether repeated dippings in half-strength would be tolerated.

Its efficacy as a tick-killer is undoubted.

Schedule No. 13.

ALDERSON'S CATTLE DIP.

This preparation appears to be somewhat similar to Erkenbrach's dip, while the arsenical content appears to be much the same. The remarks, therefore, in Schedule No. 12 apply equally to this preparation.

Six head of cattle were used for this test, as in other instances.

Schedule No. 14.

"LABORATORY" SPRAYING FLUID.

(Containing Arsenite of Soda, Glycerine, Paraffin and Soap.)

FULL STRENGTH.

(1lb. As. o to 20 gals. water.)

First spraying August 3rd, 1908.—
Cattle moderately infested.

Second to fourth spraying, 8th to
18th August, 1908.—Practically clean.

Fifth spraying, August, 23rd.—(1)
Clean, skin rough; (2) clean, skin
cracked, cast.

Sixth spraying, August 28th.—(1)
Clean, skin cracked, cast.

SECOND TEST, FULL STRENGTH.

First spraying, September 11th. —
Beasts well infested.

Second spraying, September 16th. —
Practically clean.

Third to fifth spraying, September
21st to October 1st.—Clean.

Sixth to eighth spraying, October 6th
to 16th.—Clean, skin peeling.

Ninth spraying, October 21st.—Clean,
skin cracked, cast.

*Schedule No. 15.***"LABORATORY" SPRAYING FLUID.****(A)**

First spraying, August 3rd, 1908. — Beasts moderately infested.

Second spraying, August 8th.—Beasts moderately infested.

Third to sixth spraying, August 13th to 28th.—Practically clean.

Seventh to eighth spraying, September 2nd to 7th.—Clean.

Ninth to thirteenth spraying, September 12th to 30th.—Slight reinfestation, cleaned by each recurring application of the spraying fluid.

Fourteenth spraying, October 3rd.—Clean.

Fifteenth to sixteenth spraying, October 6th to 11th.—Clean, skin peeling.

Seventeenth spraying, October 16th.—Clean, skin improving.

Eighteenth spraying, October 21st.—Clean, skin normal.

Nineteenth to twenty-third spraying, October 26th to November 5th.—Clean, skin normal.

(B.)

First spraying, August 28th, 1908.—Beasts moderately infested.

Second to fourth spraying, September 12th.—Ticks approximately half-killed.

Fifth spraying, September 17th. — Clean.

Sixth to nineteenth spraying, September 22nd to November 26th.—Clean.

(C.)

(Third test of the three-quarter strength.)

First spraying, October 12th.—Moderately infested.

Second to tenth spraying, October 17th to November 26th.—Clean.

*Schedule No. 16.***"LABORATORY" SPRAYING FLUID.**

(Containing Arsenite of Soda and Soap Solution Only.)

FULL STRENGTH.

First spraying, October 2nd, 1908.—Moderately infested.

Second spraying, October 7th.—Three adult dead adhering.

Third spraying, October 12th.—Few brown ticks, skin cracking.

Fourth spraying, October 17th. — Clean, skin cracked, cast.

THREE-QUARTER STRENGTH.

First spraying, October 2nd.—Moderately infested.

Second spraying, October 7th.—Practically clean.

Third spraying, October 12th.—Clean, skin peeling.

Fourth spraying, October 17th.—Skin cracked, cast.

*Schedule No. 17.***"LABORATORY" SPRAYING FLUID.**

(Containing Arsenite of Soda, Glycerine and Soap.)

FULL STRENGTH.

First spraying, October 2nd.—Moderately infested.

Second spraying, October 7th.—Clean.

Third spraying, October 12th.—Clean, skin peeling.

Fourth spraying, October 17th. — Clean, skin cracked, cast.

THREE-QUARTER STRENGTH.

First spraying, October 2nd.—Slightly infested with ticks.

Second and third spraying, October 7th and 12th.—Clean.

Fourth spraying, October 17th.—Skin badly cracked, cast. (Died on the 18th of October.)

Schedule No. 18.

"LABORATORY" SPRAYING FLUID.

*(Containing Arsenite of Soda, Paraffin and Soap.)*THREE-QUARTER STRENGTH
(ONLY.)

First spraying, October 28th.—Well infested with ticks.

Second spraying, November 2nd. — Practically clean.

Third to fifth spraying, November 7th to 17th.—Clean.

Sixth spraying, November 22nd.—(1)

Re-infested with many brown ticks; (2) clean.

Seventh spraying, November 27th. — (1) Clean; (2) clean.

Eighth to tenth spraying, December 2nd to 12th.—Clean.

Eleventh spraying, December 17th. — Clean, skin peeling.

Twelfth spraying, December 22nd. — Skin cracked, cast.

Schedule No. 19.

"LABORATORY" DIPPING FLUID.

(Containing Arsenite of Soda, Paraffin and Soap; 2,000 gallons; the proportion of Arsenite being 1 lb. to 33 gallons.)

First dipping, November 22nd, 1908. — Eight beasts, all well infested.

Second dipping, November 27th, 1908. — Clean.

Third dipping, December 22nd, 1908. — Skin cracking, cast.

Compare this result with that obtained by similar fluid used as spray.

Schedule No. 20.

"LABORATORY" DIPPING FLUID.

(Composition as above with 400 gallons Water added.)

First dipping, December 3rd, 1908. — Beasts (8) moderately infested.

Second dipping, December 8th, 1898. — Clean.

Third dipping, December 13th, 1908. — Clean.

Fourth dipping, December 13th, 1908. — Clean.

Fifth dipping, December 23rd, 1908. —

Five beasts cast for skin irritation; the remaining three were turned out.

Schedule No. 21.

"LABORATORY" DIPPING FLUID.

(Composition as above with a further 400 gallons Water.)

First dipping, December 21st, 1908. — Beasts (8) well infested.

Second dipping, December 26th, 1908. — Practically clean.

Third dipping, December 31st, 1908. — Re-infested with small and brown ticks

Fourth dipping, January 5th, 1909. —

Many dead forms attached, and some fresh re-infestation.

Fifth dipping, January 10th, 1909. — Clean.

At this point thirty-one head of cattle were added to the test; all beasts well infested.

Schedule No. 12.—Continued.

Sixth dipping of original eight, January 15th.—Clean.

Seventh dipping of original eight, January 20th. — Clean; remainder showed ticks dead to about 50 per cent.

Eighth dipping of original eight, January 25th.—Clean.

Ninth dipping on January 30th to fifteenth dipping on March 1st.—This herd has remained practically clean. Slight re-infestation has been observed on several occasions, but the cattle have remained tick-free during the last five or six dippings.

APPENDIX (A).

“LABORATORY” DIPPING AND SPRAYING FLUID.

(Containing Arsenite of Soda, Paraffin and Soap.)

A slightly different formula was given in the *Agricultural Journal* for the Natal spraying fluid, but it has been found on a more extended trial that efficient results are obtainable also by the use of the same fluid as that shown for the following dip. The composition as below is, therefore, adapted for both spraying and dipping.

The details for preparation are as follow:—Dissolve the soap in about 5 gallons of hot water; while still hot add this soap solution in small quantities at a time to the paraffin and beat or stir to a creamy lather. This makes the soap emulsion.

Dissolve $8\frac{1}{2}$ lbs. of arsenite of soda in a sufficient quantity (about a gallon) of hot water, and when completely dissolved add cold water up to 50 gallons. This mixture can be made in the tank. The soap emulsion may then be gradually added, stirring thoroughly the while. Add water till the tank is full (400 gallons).

This mixture should be stirred before being allowed to flow into the smaller tank when preparing the spray.

The quantity given is sufficient for 400 gallons. When it is desired to fill the dipping tank the above procedure can be adopted for as many times as is found necessary, or one mixing may be made sufficient for the purpose. Four hundred gallons, however, is a sufficient quantity to handle at one time. If a film of oil floats to the top of the dip in the tank the dip should be stirred with a stick or board before commencing to dip.

The approximate cost of the preparation for 400 gallons is as follows:—

Soft soap, $5\frac{1}{2}$ lbs., say at 6d.	2s. 9d.
Paraffin, 2 gallons, say at	3s. 0d.
Arsenite of soda, $8\frac{1}{2}$ lbs., say at 3d.	2s. 3d.
	<hr/>
	8s. 0d.

APPENDIX (B).

COMPOSITION OF DIP

USED ONCE IN EVERY SEVEN DAYS ON NEL'S RUST ESTATE.

(By courtesy of G. D. Alexander, Esq.)

Composition of dipping fluid:—

5 lbs. arsenic;
15 lbs. soda;
2 gallons of tar;
24 lbs. soap (soft);
400 gallons water.

The above is mixed in the usual way and cows and working oxen are dipped with impunity. It will be noticed that the arsenic itself instead of arsenite of soda is used and that the soda upon which the solubility of the arsenic depends is given as a separate item, the result being the same. The total quantity of arsenic present is, however, smaller in this dip than in the "Laboratory Dip," while the quantity of soap is considerably increased.

This dip has not been tried oftener than once a week as far as I am aware, but I see no reason why it should not safely be applied at less intervals than seven days.

PREPARATION FOR DRESSING EARS.

1 part "Ketrol" or "Cyllin";
9 parts grease (composed of 6 lbs. wagon oil and 3 lbs. lard oil).

This is applied with a swab to cattle while standing in the yoke or upon emerging from the dip in order to reinforce the action of the dip, and to ensure the destruction of all ticks present. It is probable that the low arsenical percentage contained in this dip makes this procedure advisable. It is, however, one which ensures the cleanliness of the ears of beasts and appears to be a useful procedure where the absolute cleansing of the cattle from ticks is desired.

Don't be afraid to buy sheep because you think your climate unsuited. Sheep are the most adaptable to change of climate of any of the domestic animals.

Natal Agricultural Union.

ANNUAL CONFERENCE, 1909.

REPORT OF PROCEEDINGS.

ON Wednesday, the 21st April, the delegates of the associations affiliated to the Natal Agricultural Union met at the Y.M.C.A. Hall, Pietermaritzburg, for their Annual Conference. The affiliated Associations were represented by the following delegates:—

- Alexandra Agricultural Society: John Kirkman.
- Boston Farmers' Association: Thos. Fleming and C. C. Lewis.
- Boven Umvoti Bcere Vereeniging: G. J. van Rooyen, jun.
- Camperdown Division Farmers' Association: John Moon and J. A. Scheepers.
- Durban and Coast Agricultural Society: T. Burman.
- Dundee Agricultural Society: A. W. Smallie and W. Craig.
- Gourton Farmers' Association: M. Sandison and R. Gray.
- Howick Farmers' Association: H. Nisbet.
- Inanda Agricultural Society: W. W. Sykes and J. G. Colenbrander.
- Klip River Agricultural Society: D. R. Bester.
- Krantzkop Farmers' Association: G. T. van Rooyen and M. Landsberg.
- Lower Tugela Farmers' Association: A. S. L. Hulett and T. G. Colenbrander.
- Lower Umzimkulu Farmers' Association: C. H. Mitchell and J. W. Aiken.
- Mid-Illovo Farmers' Club: B. B. Evans and Jos. Ballam.
- Newcastle Agricultural Society: F. A. R. Johnstone.
- Noodsberg Road Agricultural Society: F. J. Smith.
- Nottingham Road Farmers' Association: John C. Parker.
- Richmond Agricultural Society: John Marwick and W. P. Payn.
- Royal Agricultural Society: O. Hosking and D. C. Dick.
- Rosetta Co-operative Association: B. Crompton and C. R. Heenan.
- Seven Oaks Farmers' Association: W. J. Newmarch and J. M. van Rooyen.
- Upper Biggarsberg Farmers' Association: George Langley and W. L. Oldacre.
- Utrecht Farmers' Association: T. C. van Rooyen and D. van der Spuy.
- Weenen Agricultural Society: H. Blaker and J. H. K. Miller.
- Ward I. Farmers' Association, Vryheid: A. von Levetzow.

Weenen Farmers' Association: H. E. Cadle and S. B. Buys.

Witjolsie Boere Vereeniging: Thos. Wm. Dukes.

Donnybrook Farmers' Association: W. Hale Watton and H. E. Mingay.

Dronk Vlei Farmers' Association: A. W. Perceval and E. Marriott.

Natal Co-operative Mealie Growers' Association: H. Baker and J. Mepstone.

The Hon. Thos. Hyslop, M.L.A., was also present as a Life Member.

It was moved and agreed to that the minutes of last meeting be taken as read and confirmed.

Several notices of motions not on the agenda paper were handed in and accepted by the Union, to be considered in their proper place.

The election of office-bearers was fixed for 11 p.m. the next day.

HIS EXCELLENCY'S SPEECH.

At eleven o'clock His Excellency arrived, accompanied by his aide-de-camp and the Minister of Agriculture (Hon. W. A. Deane). His Excellency said:—

I am glad to welcome again delegates from Farmers' Associations and Agricultural Societies assembled in conference for the discussion of the country's predominant interests. The cloud that hung over those interests when I addressed you a year ago has, I regret, not yet been dispelled. East Coast fever continues to spread over the land. I am advised, however, that the situation is not hopeless, and that it is possible for those that still have cattle to save them if they work together with this end in view. But the complete stamping out of the disease seems beyond the resources of this colony, and I should be glad to see the public funds of a united South Africa become available for this service, which is of so great an importance to the whole sub-continent. Small stock have fortunately been free from any such devastating disease as has annihilated the herds of cattle. The numbers of sheep owned by Europeans in the colony have been steadily increasing for the last five or six years, and recently when I was in the Northern Districts I was informed that sheep had proved the salvation of some of the poorer farmers there, a fact reflected in two of the resolutions to be moved at this Conference. As regards the pro-

ducts of sheep, the Minister of Agriculture is still confident that there are possibilities before the country in the direction of mutton export, though he tells me that more attention will have to be given to breeding and feeding before the best results can be obtained. The commercial value of that other product—wool—would also be greater if greater care were taken by the farmers in the classing, skirting, and packing of fleeces.

THE LAND HUNGER.

It is somewhat remarkable that in spite of East Coast fever limiting the extent to which land can be utilised for what has hitherto been its chief purpose—the keeping of stock—there has in the past year been a greater demand for land than ever before in the history of the colony, a demand so constant that in spite of fresh areas being made available for European occupation at short intervals it has not been possible to satisfy all the applicants. The reason for this phenomenon is the realisation of the agricultural as distinct from the pastoral possibilities of this country. This in turn has been largely due to the present Government doing all in its power to encourage the export of produce to Europe, a policy which has I am sure been appreciated

by the thinking men in the colony, by those living in the towns as well as those living in the country. Many of the former are acquiring farms—not large ones of over 4,000 acres, of which we have too many (some 260) in Natal, but small ones under 1,000 acres which require good farming to make them pay but which scientifically brought under the plough can be made to pay well. Only last week a friend of mine, one of the leading professional men in this town, was explaining to me the considerable profits he calculated he would make from such a farm entirely devoted to the growing of maize. With our business men becoming farmers, and, I hope, at the same time our farmers becoming more business men, there are good prospects for our agricultural future. The staple to which the greatest stimulus has been given by the recent creation of an export trade has, of course, been maize. In 1906, when 112,486 acres were devoted to this cultivation, the value sent from Durban overseas was £2,504, and in 1907, with 117,750 acres, it was £171,169. Last year, though a larger area (143,000 acres) was devoted to mealies, the crops were not so good, and an export of the value of £163,000 left barely sufficient in the colony for food for the natives. This year the area has been again increased to about 166,000 acres. The present season's crop promises to be considerably better than last year's, and prices in England, as far as can be judged at this date, will be good, so that unless anything unfortunate and unforeseen occurs to spoil present prospects, there ought to be a big advance on the 1907 value of the export. I do not think I am exaggerating the meaning of the figures on the subject of maize production and consumption that have been published from time to time when I say that, even should the farmers in Natal greatly extend the area they devote to this grain, they will continue to get a good price for it. The overseas export of bark dates from twenty years before that of maize. It has had no very sudden growth, but has steadily increased since in 1886 wattle-growing was shown by Sir George Sutton to be a paying industry. In 1886 the export was worth £11, in 1896

£16,450, 1906 £89,443, 1907 £139,141, and 1908 £133,509. In this industry also there seems, from reports from England and the Continent, to be no reason to fear an over-supply of the market, though it may only be possible for wattle to replace other barks used in tanning if the price of it is kept down. It may also be found necessary in the future to adopt some system of grading, and I am informed that the Government is now considering this question. Fresh fruit also is becoming an article of oversea export. The value of this trade in 1906 was £143, in 1907 it was £2,739, and in 1908—a poor year—it was £2,116. This year encouraging results, both as regards pine-apples and citrus fruits, have been obtained from the experimental shipments made under Government auspices. Naartjes have realised 2s. to 7s. 6d., and common oranges 3s 6d to 4s nett per 100, and ordinary small pines 6s to 10s per dozen. These prices show that there is a market in England for good Natal fruit, and it is to be hoped that more and more advantage will be taken of that market.

GOVERNMENT FACILITIES.

It is not in England but entirely in South Africa that Natal sugar is consumed, the consumption in the other States of the Union having been £417,562 worth in 1906, £433,018 in 1907, and £614,945 in 1908. There is to be a record crop in 1909. The area under this cultivation is rapidly increasing with the additional facilities to growers that are being given in Zululand. Among those facilities have been the use of the Government steam ploughs, and I am surprised to see a motion tabled for the consideration of this Conference by the White Umfolozi Farmers' Association requesting the Government to sell these ploughs. The motion reads ill by the side of others requesting Government assistance for the White Umfolozi farmers. I have not thought it advisable on this occasion to go through the agenda paper of the Conference, and remark, as I did last year, on the various resolutions that are to come before it. Some of these resolutions have my sympathy, others have not. Among the former is

the resolution of the Dundee Agricultural Society supporting the idea of white apprentices, suggested by the Minister of Agriculture, of which the practical adoption would lead to an increase of the permanent white population on the land. Among the latter are one or two resolutions affecting natives and Indians. I need not enter into these beyond once more urging sympathetic treatment of that labour on which the agricultural development of

the colony in the existing labour conditions of South Africa undoubtedly depends. I have little doubt the Conference will exercise wise discrimination in adopting or rejecting the motions that are put before them, and that their deliberations will be of benefit to agriculture in the colony, and thereby to the colony itself. In this hope I welcome the delegates and I declare their Conference open.

The Rev. Jas. Scott moved a vote of thanks to His Excellency, which was unanimously adopted.

His Excellency having left,

PRESIDENT'S ADDRESS.

The President (Mr. E. W. Evans) then read his report, as follows:—

Gentlemen,—In placing before you the customary report for the past year, I desire first of all to extend a hearty welcome to the representatives of the various affiliated societies which compose our Union, and who assemble year by year to discuss, in the interests of agriculture, the more important questions which press for ventilation and solution.

The long-continued and increasing popularity and usefulness of our Union is proof of its value to the community, and also shows the latent capacity for co-operation which is not so conspicuous among us in other matters.

There is a decided falling off in the number of resolutions before us, but I think you will agree with me that this will prove to be no drawback.

Farmers cannot afford to be long away from their work, and to attempt to fully discuss eighty-four resolutions and ten notices of motion in three days, as was the case last year, would be beyond the practised ability of even the Legislative Assembly. I venture to hope, therefore, that fuller deliberations will be possible this year.

A GENERAL REVIEW.

I find so much of interest to review in the past year that I shall not go much into statistics, which can be gleaned from the various Government publications.

Horses have done well, and the price

of good animals has been maintained. Horse sickness, so far, has not been very prevalent, but always remains a deterrent to those who cannot afford to risk heavy losses.

It will be cheering to horse breeders to hear of the distinct advance made by Mr. Pitchford in the struggle against this scourge, particulars of which are given in his report. Natal is in large part a good horse breeding country, and I think we may look forward to a great advance in the future. The approximate number of horses in the colony in 1908 was 42,000, as against 39,789 in 1907.

Cattle, but for East Coast fever, have had a favourable year, and though no figures are available, I would hazard a guess that the natural increase has more than made up for the losses on this score.

I shall refer again to this subject under the head of East Coast fever, but would like here to express my belief in our value as a cattle country.

This has not been so apparent as it should be for two main reasons, one being the facility with which the commonest class of this stock could be disposed of to natives, and the other the great risk attending the importation of pure bred sires.

I believe, however, that many of us realise that our country is inherently valuable for cattle breeding, and that it

will not be long before a decided improvement takes place.

Sheep are estimated to have numbered 780,000 in 1908, an increase of 26,241 over 1907, and have done well also on the whole, but with wool and mutton down in price, breeders are not sanguine over the outlook.

In the Orange River Colony and the Transvaal flocks are increasing at a rapid rate, and it is obvious that some means of disposing of mutton other than by sale in this country will be necessary, or it will become an absolute drug in the market.

Breeders in these colonies have realised this, and are prepared to accept a price which will ensure a steady export trade to Europe, and already a movement is on foot which will culminate in the establishment of such a business on as large a scale as the available carcasses will warrant.

Experts have told us that South Africa is capable of equalling Australia as a sheep breeding country in both quality and quantity, and in no class of stock is the advance more marked.

Natal has hardly come into line with the other colonies, but the circumstances are somewhat different, favouring more attention being given to mutton, which results in less uniformity of wool.

But each must progress on its own lines, and we have a good opening in providing Christmas lamb for England, provided lambs are dropped in May or June, and done well up to time of shipment.

Mr. Moor has been derided for his famous shipment, but the idea is all right, and will succeed in time.

What we must fully realise is that only prime produce of any description is worth exporting or will find buyers abroad. I would like specially to draw sheep breeders' attention to the low average of lambing in this colony, which I believe to be not over 50 per cent., while in England it is from 100 to 150 per cent.

Without saying that we can quite equal this splendid record, it is certain that a great improvement can be made and maintained by keeping the ewes in uniformly good condition throughout the year, with a flush of specially suc-

lent feeding a fortnight before putting in the rams, and it will pay.

At the last Intercolonial Conference, held in Bloemfontein, Mr. Alfred Robertson, the present president, said that £350,000 was lost annually to South Africa by inefficient clipping, sorting, and baling of wool, and this I believe to be proportionately true in Natal.

In the Orange River Colony, Transvaal, and Cape experts travel among the farmers, instructing them in this art, and our breeders might seriously consider combination among themselves for the purpose of getting this valuable instruction.

Pigs are probably improving more than any other class of live stock in Natal, and one sees excellent specimens of the best known breeds all over the colony.

With our widespread mealie production and dairying we are in an excellent position to produce first-class bacon, and the establishment of the Nel's Rust factory will help along the good work.

It will soon be found that only good pigs will be accepted, and good pigs mean well bred pigs.

I look forward to the time in the early future when we shall oust all imported pig products, for I am sure that we can produce good bacon economically.

Dairying has taken a great hold on the country, and is a comforting source of revenue to many. At present the midlands and northern districts are the chief source of supply to our two excellent creameries, but there are great potentialities on the coast when East Coast fever is got rid of. I have not been able to get exact figures with regard to the production of butter, but in reply to inquiries from the Natal Creamery, Ltd., and Nel's Rust Dairy, both report a large increase during the year, the managing director of the former concern stating that their output this season is 50 per cent. higher than last, and shows a progressive output each year, being now eighteen times greater than during the first twelve months' working.

Paspalum is a great help in districts up to 3,500 feet, and when it grows freely small dairy farming will be profitable.

In my journeyings I have noticed a tendency to augment the monthly cream

cheque at the expense of the sucking calves, and this is to be greatly deprecated.

Calves that are starved will never make healthy cows, and if the natural food is taken away it must be replaced in some way, even if the profit appears less at the time—it will pay in the long run.

Farmers tempted to go in for dairying should also realise the value of good bulls, for no herd can be successfully built up without the use of animals specially selected for that purpose, and also the testing of milkers for the purpose of culling and rejecting the unprofitable ones.

Winter supply of cream is needed both for the benefit of factory and farmers, and this means feed.

FEED.

A word I would like to see printed in large letters and put up on every kraal, sheep pen, and pig sty in the country. It means regular breeding, healthy constitution, improved flocks and herds, absence from anxiety in winter, a bigger cream cheque.

In this connection I would like to mention the extreme importance of what is known as the "balanced ration." I have seen farmers giving their cows first all of one crop, and then all of another, when a combination of the two would have been far more valuable and economical.

Mr. Sawyer, of Cedara, will, I am sure, be glad to give information on this or any other subject within his sphere, to any who care to ask for it.

Cheese is not making the progress it should, and it is regrettable that the services of the late Dairy Expert were not retained for instruction therein, as much of our higher country is admirably suited to the production of an excellent cheese.

Mealies have had the usual exciting season. We had early rains, and a good start up to Christmas, and then came continued wet for two months, which almost drowned the crops, but a change to bright warm weather has saved many districts, and a good yield may be looked for.

Export is, of course, the great standby, and the price promises to be firm,

owing to the shortage of the wheat supply.

It is a great boon to growers to know that a certain 8s. per muid can be counted on, and the initiators of this movement deserve the thanks of the colony.

I would like to draw attention to the variation in the yield: 5.7 muids is about the average return per acre; while some of our more progressive men return 15.

Better cultivation is the main need, and I would draw your attention to a report in the January "Agricultural Journal" of experiments conducted at Robertson, Cape Colony, showing a marvellous increase in yield proportionately as land was ploughed one to four times.

In my own case, old land twice winter ploughed with disc ploughs, then again in spring, and well cultivated, has made an astonishing difference to the mealie crop.

I am a firm believer in fertilizing, but think something might be saved from the bill, and as good results obtained, from thorough cultivation.

Wattles continue to be extensively planted, and show the confidence of growers, despite the occasional rumours of fall in price and rise of some rival tanning product. It appears to me that the risk run is not more than an ordinary commercial one, and that those who have suitable land and climate are fortunate, and should take full advantage of their opportunities.

Fruit, as you will see by Mr. Fuller's report, is very gradually making its way on to the London market, and when this is established a steady increase may be predicted.

This applies only to coast fruits, for the up-country is so far making little or no bid for outside markets.

Sugar has also profited by the good growing season, and planters are, I believe, well satisfied.

Better methods of cultivation are now in vogue, and even the new settlers in Zululand are emphatic about the value of steam ploughs, which must be very gratifying to the Minister of Agriculture.

Tea has had a good year, and the area continues to increase. It is thought

by those qualified to know that a finer tea could be produced in Natal, and its market considerably widened.

Tobacco is a crop which ought to be making more progress than it does, for a considerable part of the colony will grow a good leaf, but, in company with fibre, cotton, and a few others, it is waiting for someone with knowledge, patience, and capital to prove to us that we have here another source of wealth.

NATAL'S EXPORTS.

The following are the exports of Natal produce during the two years ended 31st December, 1908:—

	1908.	1907.
Wattle Bark...	51,775,847lbs. £137,876.	51,223,338lbs. £139,141.
Fruit, Fresh...	£101,835.	£121,844.
Maize	66,355,077lbs. £167,804.	70,087,340lbs. £160,104.
Tea... ..	1,062,219lbs. £617,383.	1,232,183lbs. £44,984.
Sugar	77,503,010lbs. £617,383.	52,483,893lbs. £410,320.
Potatoes	11,522,808lbs. £39,183.	8,380,561lbs. £21,970.
Fresh Vegetables... ..	£8,149.	£12,558.
Plants, Bulbs, and Trees...	£4,138.	£6,323.
Tobacco, Un-manufactured	1,308,761lbs. £18,589.	1,200,604lbs. £16,788.

The most notable increases are in sugar and potatoes. Tea is evidently returning a better price, and this is probably due to a superior article being produced, while the same remark applies to tobacco.

The drop in fruit is accounted for by growers, after their experience of 1907, deciding that certain classes are not worth exporting, and confining their attention to the paying articles.

Mealie Union.—In connection with this review of the year's main articles of production, I would like to mention the Mealie Growers' Union.

Many of you assisted very kindly at the birth of this infant, and then went your way. I fear, with little thought of how it was to thrive.

It has had a trying infancy, but largely owing to the fostering care of Mr. Thos. Hyslop, M.L.A., and an en-

getic committee, it has survived, and will be a power in the future.

It is cheering to hear of the success of such movements, and I would appeal to all of you to become members, and purchase and sell through its agency. You will save your subscription in the first year, and, what is more, help to advance co-operation in a practical manner.

Land and income taxes have become law and payable, and are generally looked on as a necessary evil. The former will certainly have the effect of making owners of non-beneficially occupied farms move in the direction of development, and we may hope to see a change in the policy of waiting to be enriched by the exertions of others.

Native labour has been fairly plentiful, and there seems to be no likelihood of change in this respect in the immediate future.

But it behoves us to look ahead, for times of progress are with us, and prosperity ahead, when our labour will be keenly competed for, and scarcity felt.

Two-thirds of the natives of Natal reside on farms, and I would advise farmers to arrange that their natives are retained as satisfied labourers all the year round on the farms.

Natives who are allowed to go away to seek work during a portion of the year at higher rates of wages in towns are seldom satisfactory on their return.

Personally, I have found that a remission of rent, with a higher wage, has supplied me with native workers, who agree not to leave the farm, and who become skilled and reliable farm labourers—an insurance against scarcity, which I think farmers generally have only to try to fully appreciate.

EAST COAST FEVER.

The fever has steadily made way during the year, and we seem as little near checking as curing it.

In some districts the Advisory Boards have worked amicably among themselves and with the Government, but in others friction has been evident, and the veto of the Minister of Agriculture has been strongly resented.

The latest big outbreak in the Ixopo Division has seriously alarmed the

Cape Government, and it seems likely that the other colonies may now join hands with Natal in an organised attempt to stamp out the disease.

It is a pity that our friends across the Umzimkulu did not respond to our request for joint action two years ago, when a better chance of checking this awful scourge obtained.

I do not feel qualified to express an opinion as to whether it is now possible, under the peculiar conditions of Natal, to actually stamp out the disease by slaughter, but it is quite certain that to give in now is to lose the bulk of the stock remaining in Natal.

To some it may seem the wrong time to lay stress on the need for tick destruction, but I hold that we should continue vigorously our efforts in this direction. The late Dr. Hutcheon, speaking at 'the Inter-colonial Farmers' Conference in May, 1906, wisely said "the elimination of the tick is the elimination of the disease," and I would almost add to that "and the only elimination of the disease."

When we remember that the tick is the conveyor of redwater, heartwater in sheep and cattle, biliary fever in horses, as well as East Coast fever, and probably many other obscure diseases that our stock are subject to, it will be seen how vital the importance of elimination is.

Col. Pitchford has experimented with all the known commercial dips, most of them effective enough in killing ticks; but realising the need of one which can be used every five days, in order to cope with the particular one which carries East Coast fever, he has issued a formula to meet the needs of the case, which if we will only act together, will be invaluable to the colony.

But to be fully effective in annihilating ticks, we should have compulsory dipping or cleansing, and whatever the cost, the result will be more than worth it, in the freedom from tick-borne disease, and the increased value of our farms.

The Fencing Act No. 6 of 1907 gives power to the Government to compulsorily fence also, and would be of great assistance in fighting East Coast fever, and ridding the colony of ticks.

Complete stoppage of the movement of cattle throughout the colony is to take place from 1st May, and though it will occasion much inconvenience it will probably be generally approved. Transport for crops will be seriously affected thereby, and many farmers will suffer.

I do not see how the Government is going to supply the need, and their deplorable neglect of the roads of the country at such a crisis as this will make the difficulty all the greater.

In some districts main roads are washed away till they look like water-courses, and in others the veld has taken possession.

CLOSER SETTLEMENT.

While thus criticising the actions of Government, it is only fair to give credit where credit is due, and there is one phase of their year's work where this can be fully and freely given.

The Minister of Agriculture, with whom we all have differences at times, is a great believer in the future of his own country, and an energetic worker in its best behalf.

It is to his credit that he has seen the need for closer settlement in Natal, and not only seen it, but set to work to find out land which can be thus utilised and put settlers upon it.

Since December, 1907, he has allotted in Natal and the new territories 260 settlers on 203,600 acres, almost all to colonial men who had previously held no land in the colony, and besides these there were 195 allottees in Zululand, and 24 in the Winterton settlement.

These lands are situated from Um-tamvuna in the south to Blood River in the north, and comprise all kinds of farm lands, and the prices range from 10s. to £10 per acre.

There are still hundreds of applicants for land, and in order to obtain suitable areas it is proposed to bring an Expropriation Act before Parliament at the next session, which will enable the Government to provide for our young fellows instead of allowing them to emigrate to other colonies.

The crying need of the colony is closer settlement, and the old belief

that the land was not suitable is rapidly dying out.

Even those who may not view it altogether favourably realise that it would lessen the cost of production, and increase the value of land, while those who are more progressive know that the future prosperity of this beautiful land of ours depends on our filling it with men of energy of our own blood and race if possible.

And while colonials are asking for chances, and the land is there lying idle, it is our duty to see that land and workers are brought together for the good of all, and to enable Natal to take the place among the other colonies to which she is entitled by virtue of her many advantages.

So I ask you, gentlemen, to recognise the good work of Mr. Deane, and his loyal coadjutors, the Land Board, who have backed his efforts well.

Farm Pupils.—There is a way in which many of you can help in this coming development. Young fellows who have not experience or capital to start are constantly wishing to go on to farms as pupils or apprentices — many such have come to me in the last few years.

Farmers generally seem to be loth to take these lads, and say they are too much trouble. But any decent white youth who will try is worth his keep, and when trained is the best settler the country can have.

Most big farms in Natal are, with the best intentions of the owners, underdeveloped, and what better tenant, or share worker, on a portion of the farm could you have, than the young fellow who has been trained by you on your own land.

I recommend it to your notice, as a plan whereby you can do threefold good to the young men who are desirous of doing what you have done to the colony you all love so well, and lastly to yourselves.

Tenants' Compensation Act. — This brings me to the need which has been expressed by this Conference for a Tenants' Compensation Act.

As you passed a resolution in 1906 calling on the Government to introduce this measure, I need not go into

its merits, merely saying that circumstances now render it more urgent than ever, if our young colonists are to go on the land.

Reports.—I had intended to embody the usual reports from the various departments in this paper, but space will not permit, and they must be read separately.

BACTERIOLOGIST'S REPORT.

Colonel Pitchford says:—The disease perhaps most in evidence during the late summer, apart from East Coast fever, has been blue-tongue in sheep, especially in certain parts of the colony. The Northern Districts appear to have suffered more severely, and, as is generally if not always the case, those districts experiencing the greater rainfall have been the greater sufferers from the disease. The differences in the rainfall in various localities have been marked, and the north of the colony has been visited with unusually heavy rains; thus at Dundee the rain registered up to the end of January was eight inches in excess of the total rainfall for the previous year, while one district shows an excess of thirteen inches on the previous season. As every sheep farmer knows, a heavy rainfall generally means a bad year for blue-tongue, and the present season, which has been no exception to the rule, has afforded a good opportunity of observing the results of the vaccine issued for use against this disease. These results have been good where the operation has been undertaken early and an opportunity thus afforded for a serviceable immunity to become established. Where, however, the inoculation has been delayed the results, as was expected, have not been so good, and in one or two cases, particularly in districts such as Vryheid, Utrecht, and Dundee, where constant heavy rains have been experienced, complaints as to the failure of the vaccine to protect at all have been received. In one unfortunate instance in the Vryheid district two sheep owners inoculated and kept their sheep down on the lowlands near their homestead, and the disease setting in before any opportunity was given for an immunity to become established nearly decimated

their flocks, both inoculated and uninoculated sheep succumbing in large numbers. The necessity therefore of undertaking the operation at a time when no risk of natural infection is likely to be encountered is clearly shown by such an instance, and it should be remembered that if the operation is delayed until the season is advanced and the rains have set in no protection is likely to become established in the flock. Fortunately, however, in the great majority of instances the inoculation has had time to produce an immunity before the district became infected or before the heavy rains set in, and in such cases the best results have been reported. The mild vaccine which has given good results in the Ixopo and other districts appears to be too attenuated for the more northern districts (except perhaps in the case of imported sheep), and in future full strength vaccine will be issued in such localities, although an increase in the number of sheep reacting severely and perhaps dying must be looked for.

Horsesickness.—The details concerning the progress made in this work during the past year have been already published. A vaccine producing a mild and controllable form of the disease was used upon a number of animals, which, after reacting, were sent down to the valley of the Tugela. The results of this test were published some three months ago, and are of a most encouraging nature. The investigation terminated in the middle of January, when the last of the control or uninoculated horses died, but some twenty-six of the inoculated animals were left behind for continued exposure, and no deaths have since been reported amongst them up to the beginning of this month. Arrangements have been made for a further and more extended test, in which inoculated horses will remain under ordinary, and not experimental, conditions, and I am hoping these results will show our ability to avert a great percentage of the deaths annually caused by horsesickness throughout South Africa. I am prepared now to undertake the inoculation of foals and yearlings should any horse breeder wish to protect the same, but I should prefer to restrict this arrangement to

Natal for the present, as I think it advisable to keep as closely in touch as possible with a system newly devised. With the young animal the reaction is more certain and regular, and no cessation of work, etc., during the reaction has to be arranged for. Much yet remains to be done, however, and many of the points of this perplexing disease-study have yet to be solved before South Africa will be rid of this fatal disease.

Calf Disease.—This investigation has also made satisfactory progress. In my communication to the Agricultural Union last year I stated that extensive tests were being carried out on several different lines of treatment on the young calves of the large Nel's Rust herd, which were placed at my disposal for the purposes of the test through the kindness of the Hon. J. Baynes. The results secured are best given by the following letter just received from Mr. Alexander at Nel's Rust, who has taken great personal interest in the thorough carrying out of the various tests. Writing on the 3rd inst., he says:—

"With reference to your inquiry as to the progress of the calves treated for the prevention of the disease known as 'specific pneumonia,' I am pleased to say that we have had no fresh cases of this disease since 1st February, and I have very great hope that you have once again succeeded in giving amelioration in a disease which has caused immense loss to the colony. Judging from last year's experience and the results obtained this season up till now, I am exceedingly hopeful that the powder you have produced is going to be a complete preventive against the disease. As you know, for many years we have suffered heavy losses from the so-called 'specific pneumonia,' and last year the treatment greatly reduced the mortality. By the end of June of this year I think we shall be able to say definitely to what extent the powder will give immunity. Personally I think, writing at the present time, that it is going to be most successful, but I am not desirous of making the mistake of jumping to conclusions until the matter has been proved to the hilt, and for this reason I say I shall be

able to give you definite information by about the end of June.

"I beg to thank you much for what you have done in the investigation of this disease, and Mr. Baynes wrote to me from England to convey to you his thanks and appreciation for the assistance you have given dairy farming in this colony by your investigations into this serious disease."

From the foregoing letter you will be able to judge just how the matter stands in practice, but until I am assured of the new system of treatment, which is the giving of the anti-toxin of the disease by the mouth in the form of a powder, by extended trials in all parts of the colony I shall ask your forbearance in the general promulgation of the system. I am meanwhile extending my inquiries as to the distribution or prevalence of the disease, and find it far more widely spread than I had at first thought. The hinderance which this one calf disease must be to the dairying industry throughout Natal must be enormous.

I fear my communication, though only dealing with a few points, has already become too lengthy, and I should have liked to bring more prominently under your notice the newly-devised system of spraying cattle, which I believe will gradually supersede the system of dipping for small herds. As I hope to be able to have a spray-pen erected at the forthcoming agricultural show in Maritzburg, many will be able to judge there of its possibilities. There are several other points of interest which I should like to have brought under your notice, but space forbids my doing so. Enough has been said to show that the work of research is not standing still, but that, with our small organisation and endowment, Natal is doing her best to keep to the front in the advance of the agricultural progress of South Africa, a progress hitherto so hindered by its animal diseases.

THE P.V.S.

Mr. Power says:—I regret to say that East Coast fever continues to spread throughout the colony, in fact, a very alarming increase in the number of outbreaks has taken place within the past twelve months, so that at the

present moment there are only a few districts uninfected. You are, I have no doubt aware, that Ministers decided some time ago to abandon the stamping-out policy, and since that date have taken over cattle from those farmers wishing to dispose of them*at the schedule prices laid down in the East Coast Fever Act. This has enabled many farmers to get rid of their surplus stock, and also to dispose of whole herds in cases where the disease has appeared amongst them.

The largest and most serious outbreak of East Coast fever that has yet taken place occurred a couple of weeks ago in the Ixopo district. The two very serious points in connection with this outbreak are, that the disease has existed on certain farms at least since December, 1908, and that authorised movement of cattle was still taking place until the disease was diagnosed on the 11th March last. Owing to the movements which have been allowed from the actually infected farms within the past three or four months, it is now quite impossible to say to what extent the disease has spread in this division.

There should not be at this late stage any need for impressing upon stock owners the urgent necessity or prohibiting all movement of cattle with the exception of those intended for slaughter in districts before the disease appears there, but notwithstanding the many examples—like Ixopo—we have had, there still exists a large section of the farming community who stoutly oppose restricting movement of cattle, and who claim that it is quite time enough to take this step when the disease appears in their district. We have continually pointed out that, owing to the insidious nature of the disease, the free movement of cattle in a district until the disease appears can only be attended with the most disastrous results, because—as in the Ixopo district—the disease is usually in a district many months before the majority of stock owners are aware of it, and cattle are still being allowed to travel from farms where animals are actually dying from the disease. I am sure the President of the Natal Agricultural Union has not failed to

observe that there are very few districts in the colony that have been placed in strict quarantine with the approval of the districts concerned.

Prohibiting movement of cattle has met with the most fierce opposition in most of the districts, and this too amongst some of the most enlightened communities in the colony. We realise that movement of cattle cannot be prohibited without inflicting hardships on many of the inhabitants, but at the same time it must be borne in mind that East Coast fever cannot be eradicated without inflicting hardships, and I claim that the advantages to be derived from prohibiting movement of cattle far outweigh the disadvantages. The outlook in connection with this disease is most serious for the whole colony, as while susceptible cattle remain on infected veld so long will the disease continue to exist.

Until about eighteen months ago there was very little lung sickness in the colony, but at present I regret to say that there are a large number of outbreaks in Alfred County.

Epizootic Lymphangitis.—This equine disease has latterly made its appearance in several districts, but particularly on the North Coast and in Zululand, and if it is not dealt with in a very drastic manner it threatens to become a very serious drawback to the equine transport which has now become very largely used throughout the colony.

Glanders.—I am pleased to be able to report that very little of this disease exists nowadays.

Horsesickness.—So far very few deaths this season. If there is any other matter on which I can give you any information I shall be very pleased to do so.

THE EXPERIMENTAL FARMS.

Mr. Sawyer reports:—The character and scope of the past two years' work in my division has been determined by the financial situation, and represents an effort to bring our various operations to a profit-producing stage at a minimum outlay for current expenses. A reduction of our vote to a half of that granted for 1905-6 has necessarily

curtailed development, and has postponed the completion of many of our investigations, but every effort has been made to maintain existing assets as sources of future income. Total expenditure for the present financial year will have amounted to £13,000 for all services connected with four Government Farms, School of Agriculture, Analytical and Biological Laboratories, Crown forests and afforestation, dairy work and orchards, against which a revenue exceeding £5,000 will have been obtained by the end of June, representing a trebling of former income from our farms. The prevalence of East Coast fever has had the effect of reducing forest revenues to a negligible sum in the absence of any possibility of transporting lumber, and has further prevented the sale of stock from Cedara. For the forthcoming season our estimates provide for the payment of salaries of the European staff and a nominal grant of £100, all other expenditure, including payment of native wages, to be met from revenues derived.

The reproductive character of much past and present expenditure would appear from an examination of such of our permanent assets as will reach the profit-bearing stage before the end of the year 1910. It has consequently been suggested that a profit and loss account be instituted for the division to be supplemented by a small annual grant payable until the end of the financial year 1910-11, after which our various institutions will be self-supporting.

Publication of Experimental Data.—An exhaustive report, embracing a digest of all data secured from our experiments during the past seven years, is now in the printers' hands, and will obviate any necessity for detailed statements on this occasion. The report will be published in three volumes under letters "The Cereals in South Africa," "Feeding Crops and Livestock Management," and "Tropical Agriculture on the Natal Coast," which should have a relative interest to clearly-defined groups in our agricultural community.

School of Agriculture.—The number

of students resident at our School of Agriculture and Forestry has been limited during the past year only by existing accommodation. Authority was recently obtained to erect two additional dormitories in bungalow form to enable us to entertain additional applications to a total of fifty. The actual cost of these two buildings, which were erected by students under instruction, was £150.

The appointment of a resident Biologist has greatly increased the value of our curriculum, and opens a prospect of establishing a university teaching centre at Cedara in the near future.

I am glad to report that all students on completion of their course have obtained satisfactory and remunerative employment.

Farm Work.—The acreage under cultivation at Cedara has been extended by the sub-soil drainage of the vleis, from which areas good results should be obtained in the future. The incessant rains and mists experienced throughout the season, together with almost complete absence of sunshine, had the effect of chilling vlei soils to a temperature of from 43 to 45 degs. F., with a consequent loss of late planted maize, the seed of which rotted in the ground. Such a result would not have been experienced in a normal season as soil moisture was not at any time excessive or stagnant. Remarkably satisfactory results have been obtained with the bullrush millet as a silage crop, both with soy beans as a grain crop, both being worthy of general adoption in the midland districts. Potato investigations have included the trial of types recommended for export purposes, a consignment of which leaves for London, packed in peat, during the current month. A successful endeavour has also been made to establish the value of several oil crops, including flax, hemp, rape, ground-nut, etc. Rice has been successfully harvested from flooded plots in the vlei, and buckwheat has proved a very remunerative crop, from which a large supply of honey has also been derived.

At Winkle Spruit a number of new

types of sugar cane, pineapples, bananas, fibre plants, etc., have been established for trial and future distribution. An additional acreage has been cleared of bush for an extension of revenue crops. The area under sugar cane at his centre now exceeds 150 acres, which will be harvested during the coming season, and suffice to more than support the expenses of the farm.

At Weenen the results from our wheat experiments have been sufficiently satisfactory to warrant the clearing and cultivation of an additional sixty acres in the settlement for an extension of this work. Further experiments with lucerne now enable us to offer exhaustive advice on the cultivation of this crop. A four course rotation covering two years with wheat, maize, peas, tobacco, in the order named, has been found to give a maximum profit per acre, on ground suitable for lucerne. The orchard at this centre, twenty-eight acres in area, is now bearing heavily, and drastic thinning has been necessary to prevent exhaustion of the young trees.

Dairy Herd.—A thorough weeding of our dairy herd has been effected on the basis of milk and butter fat records, and numbers now total approximately 100 head with young stock. Cedara-bred heifers by imported bulls show a marked advance both in conformation and milking qualities on the cows constituting the original herd. Dipping has been effected at intervals of seven days for twenty-eight weeks with full strength Quibell's paste. This experiment has proved that regular dipping with this preparation at even frequent intervals does not affect the milk flow, nor lead to skin injury. Calves have received similar treatment. Students from our school have repeated former successes in the butter-making competition at Maritzburg, and have been since engaged in giving demonstrations in the Northern Districts. Cheese-making has been added to our dairy course, and a considerable quantity of this product secured for winter consumption and sale. Inability to secure permits for removal has prevented sales of

young bulls, several of which are available for disposal on removal of restrictions.

Poultry.—Unexpected success has attended our first year's work with poultry, birds sent from Cedara to the Conference show at Maritzburg securing three challenge cups, including that for the best bird on show against over 2,000 entries. The advertisement thus secured has enabled us to dispose of all selected cockerels at remunerative prices, the income thus derived meeting original cost of breeding pens and all expenses of management. By retaining pullets, large supplies of eggs have been secured and sold on the Johannesburg market, or utilised at the school. The possession of complete egg records for all birds should enable us to largely improve our strains for utility purposes. It is intended to organise an egg-laying competition for the whole colony at Cedara during the coming season.

Bee-keeping.—A small apiary has been established at Cedara with 20 hives, and the immediate results have been very encouraging, the gum plantations affording an almost constant honey flow throughout the year. The source is supplemented by winter crops of lupins, vetch, clover, and buckwheat.

Paddock feeding of pigs, as a commercial experiment, is being proceeded with both at Cedara and Winkle Spruit.

Crown Forests.—The earlier cessation of felling due to the prevalence of coast fever has already led to the practical depletion of stocks of indigenous timbers. This condition finds reflection in the re-opening of the Qudeni Mill, the establishment of mechanical traction in Alfred County, and several inquiries for entire sections in the more readily accessible forests. The extension of the Cape-Natal line to Riverside fortunately taps the best of our native timber, and considerable activity is expected in this neighbourhood. Foresters during the period of stagnation have been required to devote their spare time to the establishment of nurseries and afforestation work.

Afforestation.—Plantations are being extended at Cedara and elsewhere to the limit of our financial resources, particular attention being given to the more valuable coniferous timbers, the adaptability of which has been established by earlier experiment. The conservation of existing plantations has, however, made a large demand on our labour supply during the past year. In addition to the essential work of clearing and burning fire-breaks, all the eucalyptus belts have been thinned, and similar treatment must be afforded to 700 acres of cluster pine during the coming winter. Established black wattle plantations in the possession of the division now amount to 465 acres, of which 200 acres will reach stripping age during the coming season. Other plantations situated at a distance from the railway line have been granted on short leases to private planters, in the absence of any possibility of exploiting same with the limited staff of foresters now employed.

The output of timber transplants from the forest nursery continues to expand, and revenues from this source have been considerable.

Orchards.—The Cedara orchards have made very satisfactory growth during the past two seasons, and should be in full bearing by the season 1910-11. The current year's crops have been marketed to advantage in Johannesburg, and encouraging reports received from salesmen at that centre. A portion of the crop has been evaporated by different methods, and a selection of the dried fruits forwarded for commercial valuation to London. Small fruits, and particularly strawberries, continue to prove a reliable source of income.

The Laboratories.—The Analyst's time is more fully occupied than ever with the examination of fertilisers, local and imported, wattle bark, soils, dairy products, fibres, etc., while in the newly-established biological laboratory arrangements have been made for the testing of agricultural seeds. This will meet an often expressed want for some reliable means of determining germination and detecting the presence

of weed seeds and other impurities in imported consignments. Natal remains one of the few British colonies unprotected by legislation in this respect, and in the absence of any such protection, provision for examination of seeds would appear to be doubly necessary.

THE ENTOMOLOGIST.

Mr. Fuller says:—In reply to your letter of the 17th inst., you will forgive me if I answer the same very briefly.

What has been done may be summed up in these few words: The export of Natal citrus fruits and pineapples to the London market has been proved profitable, and, further, the improved culture of both these fruits is capable of extension and development, especially the culture of Naval oranges.

Practically the whole of my time for twelve months past has been taken up with fruit export matters. I do not wish it to be inferred that great progress has been made, but rather that a few paving stones have been laid down in the road to success. The departmental export of last year and arrangements for the continuity of the scheme this season have taken up my time very fully, and the work in other lines has been somewhat neglected, except as regards the export of pineapples. Since the 1st of January four experimental shipments of Natal pineapples have been forwarded to the London market, and the concrete results of these experiments are that it is settled that fruit can be placed upon the market in a satisfactory condition, and that the prices realised, despite very high shipping rates, are sufficiently profitable.

In this connection I would draw your attention to a report, which should appear very soon in the Press, upon the first shipment, and the best features, of which I hope to confirm by the results of the later three shipments.

Our locust campaign this year has been conducted by my assistant, Mr. Kelly, so that I have been relieved of a great deal of work in that direction. Fortunately, the invasion of hoppers was not a large one. At the same time, the campaign has been as extensive and thorough as funds have permitted. Our

locust officers were at work in the Ubombo, Hlabisa, Eshowe, and Lower Umfolozi districts of Zululand, in the Ngotshe division of the New Territory, and in Victoria, Durban, Alexandra and Alfred Counties.

I take pleasure in forwarding you a copy of the first report of the South African Central Locust Bureau, and the proofs of the second report (which will presently be published), both representing some of the work I have had in hand during the past year, and from which the President may gather some data relative to the general adoption of the Natal methods of locust destruction throughout South Africa, and the work accomplished.

I would like to record my appreciation of what has been done by these gentlemen, and to express a sincere hope that the valuable data obtained and the progress made in scientific investigation, and agricultural education, will encourage this Conference to stand by the Government in its endeavours.

All the officers whose reports have been read are heart and soul in their work, and it is only fair that they should receive the appreciation of the public they serve so well.

To know that we are almost, if not quite, masters of the bluetongue in sheep, horsesickness, and specific pneumonia in calves is most gratifying, when we consider our position in regard to these diseases five years ago, and we should look on it as a calamity if this good work is not pressed on with all the vigour and enthusiasm of which we are capable.

Fowl sickness is a disease which our bacteriologist has not yet had time to investigate, but we all know what a scourge it is, and how it prevents the improvement in the breed of fowls, an adjunct to the farm, the value of which we cannot fully realise, owing to the attendant risk.

Inter-Colonial Union.—The usual annual Conference was held at Bloemfontein in November last, when your delegates took part in the discussion. Natal brought forward a number of resolutions, and carried several

of importance on the following subjects:—Compulsory dipping or cleaning; Shipping Ring freights; eradication of locusts; labelling imported meat; uniformity of weights and measures; reward for East Coast fever; inspection and grading of all products for export; and the need for inquiry into the origin of stock diseases.

These meetings are of great importance in stimulating progress in agriculture and promoting good feeling between farmers in the various colonies; and I trust we shall continue to support the Inter-colonial Agricultural Union heartily.

THE FUTURE.

I fear, gentlemen, I have wearied you, but I cannot close without a glance at the future.

I am a true lover of Natal and a profound believer in its possibilities; already, with our sparse population and native difficulties, we have done much and proved the value and suitability of many products, and it only remains for us to go forward with stout hearts and belief in ourselves to succeed to an extent undreamed of twenty years ago.

But we must go on the lines of progress; co-operation must be used wherever possible, in buying and selling, in the use of steam ploughs and harvesting machinery, in obtaining military and other contracts, and many other ways which will develop as we become familiar with the system, which has made communities prosperous the world over.

Scientific investigation, as I have already said, must never be checked, and I would like to see a renewed attempt made to find a cure for East Coast fever—why should we sit down and say there is no cure.

Agricultural education must be encouraged if we are to succeed, and country schools might be utilised in this respect, if it is too early to expect the town schools to do so. I am glad indeed that our farmers are sending their boys to that excellent institution Cedara College; it is the best testimony

to its success, and I would never send a boy of mine out of the colony while such a college, run as it is, exists.

Better statistics should be annually collected and published periodically, particularly with regard to our main products. Mealie growers last year might have realised better prices had such statistics been available at the right time.

There is great need, in my opinion, for capable travelling lecturers to go from farm to farm giving demonstrations, and instructing farmers on the spot, particularly in cheese making, orchard pruning, and tree planting, irrigation (which is possible in many places throughout the colony on a small scale), and the treatment and manuring of soils.

These could be arranged at a very moderate expense, and would expedite the sound prosperity which is not far off.

We have made great progress already in exporting mealies and fruit; that of mutton is not far off, and with East Coast fever a past bad memory, I see no reason why a great national industry in dairying and the export of beef should not follow.

I have to thank the members of the Executive for their attention to the duties that have devolved upon them, and the never varying interest of the secretary who has now become a component part of our Union.

A word is due to the Press also for their recognition of our position, and the admirable reports they always publish of our proceedings, not to mention the useful material they issue themselves from time to time in their daily Press, which I know you find very useful and interesting.

The "Natal Agricultural Journal" also deserves praise for its strenuous efforts to keep abreast of the times, and to provide farmers with both original matter and valuable information about agriculture in other lands.

Gentlemen, I thank you for your patient hearing, and now express the belief that we shall all pull together, and work hand in hand for the good of all and our beloved colony.

EXECUTIVE COMMITTEE'S REPORT.

The Executive Committee's Report was then read. The Report was as follows (we have, owing to considerations of space, been compelled to omit the notes on the proceedings of meetings of the Committee at various times during the year. Notes on some of these have already appeared in the *Journal*):—

Gentlemen,—Your Executive begs to report on the action taken during the year to carry on the work of the Union.

RESOLUTIONS.

The resolutions passed at the last Conference were duly forwarded to Government. It may be remembered that the first resolution last year was a complaint regarding the delay of the Government in sending replies. On this occasion the replies were received in time for an Executive meeting on 10th June. On this date the Executive fully discussed the replies and gave instructions for pressing certain resolutions, to which replies that were considered unsatisfactory had been given. All replies are printed in appendix.

PUBLICATION OF PROCEEDINGS.

A new departure has been authorised in the publication of the proceedings of the Executive Committee in the *Agricultural Journal*. This allows all members the opportunity of learning what the Executive is doing during the year. The August and September numbers (1908) contain the proceedings of the Committee and also give a summary of interviews with the Minister of Agriculture on agricultural matters, and the Minister of Harbours and Railways and General Manager of Railways on railway matters.

INTER-COLONIAL UNION.

The resolutions passed at the Conference of the Inter-Colonial Agricultural Union at Bloemfontein on 25th November are printed as an appendix. Your Union was represented by the following delegates:—Messrs. E. W. Evans, (Rev.) Jas. Scott, W. Craig, Jas. King, C. H. Mitchell, F. A. R. Johnstone, T. Burman, H. Wiltshire, H. Bazley and H. Watkins-Pitchford.

INTER-COLONIAL CONFERENCE.

Mr. Thos. Hyslop, M.L.A., attended as an unofficial delegate at the Inter-Colonial Conference on Customs and Railways. That Conference resulted in the larger Closer Union Conference, from which has issued the Draft South Africa Act. Mr. Hyslop was a delegate at the larger Conference, but as a representative elected by Parliament.

FINANCE.

The statement of receipts and expenditure to 31st March shows a balance of £6 0s. 11d. There are a number of societies with subscriptions



Improved White Burley, crossed by Havana seed leaf. Photo taken just before being topped.



Another cross of White Burley—a long and broad leaf—almost ready for topping.

TOBACCO CULTIVATION AT UMKWAHUMBI VALLEY (BEAUMONT).—I.
(See Article.)

outstanding. It is hoped every affiliated association will see that its subscription is promptly paid, otherwise the work of the Committee becomes hampered.

SOUTH AFRICAN PRODUCE RATES.

The Committee directed to take up the matter of South African produce rates with the Government had long interviews with the Minister of Harbours and Railways and General Manager of Railways, details of which are published in the *Agricultural Journal* of September last. On account of complaints about the new tariff the question of rates has been fully gone into, and a report is submitted to the Conference.

INTER-COLONIAL AGRICULTURAL ASSOCIATION.

The President said that Mr. Robertson, the President of the Inter-Colonial Agricultural Union, who was president, had something to say to them regarding the formation of an Inter-Colonial Agricultural Association.

Mr. Robertson, who was received with applause, said he wished to thank them for the opportunity he had had of meeting them that day. He thought it was most essential, as President of the Inter-Colonial Union, he should make himself acquainted as much as possible with the needs of the farmers throughout South Africa. All the farmers of this sub-continent should join together as closely as possible in order to develop the industry they represent. He would be sorry to hear that any association or society should break away from the Agricultural Union: such an association would be ill-advised to sever this connection. There was political union in the air, and if union took place farmers should also combine. In the Inter-Colonial Agricultural Union they had such union. The Inter-Colonial Agricultural Union should be in a position to deal with all matters of interest to farmers throughout South Africa.

Another question he wished to speak upon was that of East Coast Fever. This question would no doubt be fully discussed by them at that Conference. It was properly a South African question. He was very pleased to hear the sentiments that had been expressed that morning by His Excellency the Governor, regarding the need for the co-operation of the other South African Colonies. It was a national danger. A good general met his enemy wherever his enemy might be; and he thought it was the duty of all the Governments of South Africa to combine to meet that enemy wherever it might be. Let them concentrate their forces. Let them eradicate this disease from out South Africa as soon as possible. Every day's delay was retarding the agricultural progress of South Africa. Unless they took more effective measures they were going to have the disease spread. This had been predicted two or three years ago by experts in the Transvaal. He hoped effective measures would be taken by all the South African Governments. Never mind what the cost might

be. He hoped their deliberations would enable them to bring pressure to bear upon the other South African Governments to take concerted measures.

Mr. Robertson then read a resolution which had been passed at the last Conference of the Inter-Colonial Agricultural Union, *viz.*:

"That the time has arrived when the Inter-Colonial Union of South Africa should get into touch with the International Agricultural Association, with a view to joining that body if possible, and further, that this matter be referred to the Executive of this Union for immediate action."

Referring to the International Agricultural Institute, he said some of them had had hazy ideas of this institution, and consequently the Executive was instructed to ascertain how far the South African Inter-Colonial Agricultural Union could affiliate with them. They came to the conclusion in the Transvaal that probably it would be a difficult matter to carry out the resolution. An alternative scheme was put forward. It was suggested that it would be far better to affiliate with the other British Colonies rather than with an International Institute. An Inter-Colonial Union in its true sense might be more advantageous if they could come into touch with farmers in other parts of the Empire, and have a Congress every three or four years, first in England, then in Canada, and so on. It would lead to greater good for them all. (Hear, hear.) In the event of war, an Inter-Colonial Agricultural Union would be of far more assistance to the British Empire than the Colonies acting singly could be. Mr. Robertson wrote to the presidents of the various agricultural unions throughout South Africa, and they had all fallen in with the idea. There were many matters of inter-colonial interest which might be discussed by such Congresses. It would take a number of years to get the idea into working order, but he put the matter before them in order that they might know what was being done and might be able to consider the matter.

The Chairman thanked Mr. Robertson on behalf of the Conference for his attendance and his able address.

The Secretary read a letter received from the Secretary of the Prime Minister relative to an Irrigation Congress at Robertson, C.C., in May. The Government did not intend to send delegates, but the Union might care to do so.

The resolutions passed last year relative to C.O.D. rates, rates on mealies, etc., reward for cure of East Coast Fever, production of alcohol, manufacture of paper, importation of meat, diamond drills, and checking sacks of fertilisers on the railway, were returned to Government for further consideration.

EAST COAST FEVER.

The Chairman thought they should ask Mr. Deane to speak on the subject of the eradication of East Coast Fever before they took up the resolutions on the subject of East Coast Fever now before the meeting. They must absolutely stamp it out, whatever it cost. If Mr. Deane was supported by the Conference, they would be sure to get the assistance they wanted. They must speak strongly and let the past be buried. (Hear, hear.)

Mr. Deane said he welcomed the opportunity of saying a few words at that stage because he thought his remarks would probably keep the discussion within certain limits. He was sorry to have to refer back to justify the action which he intended to take in the future. He then referred them back to March, 1908, when they were last together and the position of East Coast Fever was last before them. On that occasion their opinion and advice was asked, and they said that they were the cattle owners and were to have control. The Government allowed them control, and that system had been in operation for twelve months now. He was sorry to say that the Government had not obtained the co-operation they should have had under the circumstances. If there was ever a time that the Government needed co-operation it was needed at the present time in fighting this pernicious disease. The Government had had all sorts of trouble in connection with the Advisory Committees. When he had gone to certain meetings he had been threatened with violence if he did not consider and give further extensions of time in regard to the movements of cattle. In some cases the Advisory Committees had done good work, but they were very few and far between. Some had been responsible for spreading disease through absolute carelessness. In some cases they had been successful in suppressing the disease, but in other cases the disease had been burning for months without the Government having the slightest idea, notwithstanding the Boards were supplied with slides free of charge.

Now he thought he had said enough to justify the Government's future action. Henceforth the Government was going to have control of the movement of cattle, whether for slaughter, transport, or otherwise. In addition, the movement of hides, fodder and anything likely to spread the disease would be controlled by Government. Permits would also be withdrawn.

Now he proposed to take the course of appointing in each district East Coast Fever officers. Such officers would temperate, brand and conduct the cattle personally to the railway station. This was the policy they intended to follow in future.

As regards fencing, the Advisory Committees had been empowered to push on the fences, but they had in many cases ignored the exercise of those powers. The Government had agreed to supply money for the

fencing of those farms belonging to poor farmers. But farmers able to supply their own fencing material had applied to the Government to do their fencing, and in his opinion it was not fair that the Government should assist them.

As regards the position of East Coast Fever at the present day, Mr. Deane said it was very serious indeed. There were only three Counties in Natal that were free from it. 'The system of stamping out had been far from successful; in only three cases—namely, in the Alexandra District, in the Dundee District, and in the Newcastle Division—had they been successful in checking the spread of the disease. It was futile endeavouring to overcome the disease by the system of stamping out which they had employed in the past.

A thorough system of stamping out would involve the expenditure of a sum between £300,000 and £400,000, and Natal was not prepared to meet such expenditure. That was the great difficulty the Natal Government had to face in connection with the elimination of East Coast Fever.

In regard to the Native cattle owners, great difficulties had presented themselves. They were the largest cattle owners, and they were opposed to all or any regulations that the Government thought fit to make.

In conclusion, Mr. Deane said another difficulty in their way, and perhaps the most important, was that of illicit moving of cattle. They could minimise it, but it was one of the gravest dangers they had to face at the present time.

The following was the first resolution on the agenda paper, standing in the name of the New Hanover Agricultural Association:—

"That the Natal Agricultural Union is of opinion, that all steps hitherto taken to combat the spread of East Coast Fever have only slightly hindered the progress of the disease, and in the interests of the whole Colony—commercial, industrial and farming—it is necessary that the disease be eradicated. Further, that though this cannot be done except at considerable expense, still, considering the interests involved, the expense should at once be faced."

The Rev. Mr. Scott first moved that the Conference go into committee.

Mr. Van Rooyen moved that they go on in the ordinary way.

Mr. Van Rooyen's motion was lost.

Mr. Scott's motion was carried.

In moving the resolution sent in by the New Hanover Association, Mr. Scott said the disease was undermining the prosperity of the whole Colony. What had been done already had only slightly hindered the spread of the disease. What, then, were they to do? The Minister of Agriculture had failed, the Advisory Boards had failed, the Veterinary

Department had failed. The steps they had been taking were utterly useless. A new regime was necessary. Mr. Deane's proposal to stop the movement of cattle was splendid if it was to mean the stoppage of the movement of every beast. Stoppage of all movement must be enforced for six months. (Cheers.) Let them fence-in every infected area; and let every animal moving from those areas be unconditionally shot. The third thing was: Exterminate the ticks. He assured them it was perfectly possible to absolutely exterminate all ticks. He had studied the question well, and he knew. He recommended then the stoppage of movement of all cattle for six months; fencing; and extermination of ticks. (Applause.)

Mr. Newmarch thought it would be advisable to hear Mr. Gray, the Government Veterinary Surgeon from the Transvaal, before going on with the discussion of the East Coast Fever resolution.

Mr. Johnstone moved, as an amendment, that they proceed at once. This was seconded and carried.

Mr. Johnstone said that, to a certain extent, censured the Government, but he admitted that the Government had succeeded in a few cases. He said that the stoppage of the movement of cattle would place farmers in an awkward position owing to the difficulties which would ensue as regards the marketing of stock. Whatever regulations were enforced, however, as regards the Europeans must be enforced as regards Natives. Referring to efforts which might be taken to exterminate ticks, he said that unless the principle was applied to the Native locations it was absolutely impossible to exterminate the tick. There was only one way—the Transvaal way: to stamp out cattle where the disease occurred. This had proved effectual in the Transvaal.

Mr. Van Rooyen thought the only way was to stamp out. It would not cost as much as many people thought. But every beast in an infected herd must be slaughtered. There must, further, be no movement of cattle. So long as there was any movement there would be danger of the spread of the disease.

Mr. De Waal hoped that whatever recommendations the Union might make the Government would support. Proceeding, he referred to the way in which the Mohammedan traders were travelling from kraal to kraal among the natives. He said there was nothing to prevent their parcels and goods carrying ticks. If they would stop the disease they must put up with the expense. They must stamp out and stop all movement. (Applause.)

Mr. Hulett said that they would never get rid of the disease unless they stamped out cattle in infected areas and fenced in those areas. And they must apply that principle to Natives' cattle also. He took exception to the Minister of Agriculture's decision that healthy cattle could be moved for slaughter. That should not be allowed.

In reply to a question, Mr. Scott said that his Association had given him instructions not to vote for any motion in favour of stamping out without compensation.

One delegate declared that Mr. Scott's idea that all the ticks in the Colony could be eradicated was absurd. The only way to eradicate the disease was to stamp out the cattle. No other method would prove effective.

Mr. Marriott referred to the danger to the Colony of the unfenced farms belonging to absentee landlords. Illicit movement took place along their unfenced farms and unfenced farms occupied by Natives. The Government had placed £5,000 on the estimates for fencing. He held this amount was totally inadequate. He considered it was no good maligning the Advisory Boards unless the latter were given control over the Natives' cattle. He had heard that Indians in Pietermaritzburg were able to get permits to go and purchase hides. If that were so, it was a terrible thing. He said the Minister of Agriculture had failed, and the Advisory Boards had failed, and he wanted to know what new policy the Government was going to institute.

Mr. Deane said that the Advisory Committees themselves had given the permits to Natives and Indians to trade in hides.

Col. Crompton said everyone seemed in favour of stamping out. This was too big an order. If they knew that the other Colonies were coming to their aid, well and good, but Natal cannot stand the brunt alone. (Hear, hear.) The stamping out must be thorough. As regards the question of eradication, he said this was certainly possible. There was another point: if cattle were dipped consistently, they must be clean. If every beast in the country were dipped, every beast would be clean. Compulsory universal dipping must be enforced, not stamping out.

At the beginning of the evening proceedings of the first day, Mr. Evans introduced Mr. Gray, the Chief Veterinary Surgeon of the Transvaal, who would address the Congress on the subject of East Coast Fever.

Mr. Gray, who was received with applause, said he was not going to make a speech, but that he had prepared a few notes which he would read to the Conference. Mr. Gray thereupon delivered the following address:

"The disease under consideration, which is now only too well known throughout South Africa, has been in existence in the Transvaal for a period of seven years. During this time it has only been prevented from overrunning the whole Colony by the exercise of the greatest vigilance on the part of the Authorities and by the self-denial of the stock-owners, who have suffered grievously through its ravages, and, although it would be premature to assume that all danger is past or yet that the time has come when we can safely take off our armour, the progress we have lately made in beating it back is encouraging, and I have ventured to think that a comparison of the position in the Transvaal now with its condition at the

earlier stage of its invasion by this disease, and a few remarks on the means by which the improvement has been brought about may serve to encourage those who find themselves in less happy case by reason of circumstances over which they have no control. Native rebellions being incidents which hardly enter into the calculations of those who are called upon to combat the progress of a stock disease!

When East Coast Fever first invaded the Transvaal the general public, not recognising the disease, in many cases failed to notify the Authorities of its existence, and as a consequence at the end of 1903 centres of infection had established themselves in every district in the Colony with the exception of Standerton, Heidelberg, Potchefstroom, Bloemhof, Wolmaransstad, Litchenburg, Krugersdorp, the Witwatersrand and Marico. In some of the infected districts, notably those Lydenburg, Middleburg, the Zoutpansberg, Rustenburg and Piet Retief, the number of farms upon which the disease had appeared was very considerable. Later the districts of Heidelberg, Marico, and the Witwatersrand were added to the list of infected areas, so it will be seen that at a comparatively early date the disease obtained a very thorough foothold and threatened to overrun the whole Colony.

Owing to the unsettled state of the country after the late war the authorities experienced very considerable difficulty in carrying out the programme projected by them for checking the further spread of the disease, and by reason of the fierce opposition to their adopted policy displayed in the districts of Lydenburg and Barberton they were compelled temporarily to abandon any effort to control the disease in these two districts, the local population maintaining that it was to the farmers' interests to save their stock, that they would do so, and would stamp out the disease without being compelled to submit to irritating restrictions. This feeling, which showed itself in its most acute form in the aforementioned two districts, was also apparent to a less degree in other parts of the Colony as well, and as a result a good deal of valuable time was lost in making a commencement with repressive measures. Briefly speaking, the policy then inaugurated has been consistently adhered to ever since, and of this policy the essential features were, first, the locating of outbreaks of disease; second, the regulation by a central authority of all movements of cattle, such movements being reduced to a minimum in those districts in which the disease had made its appearance; and, third, the adoption of such measures as circumstances would permit to prevent cattle leaving infected areas, notably by the erection of fencing. Here and there, as circumstances permitted, certain modifications have been introduced, such as the slaughter of cattle within infected areas, but in the main the policy of the Department remains to-day much as it was in those earlier days when the disease first made its appearance.

"I do not contend that the lines of action which have been followed

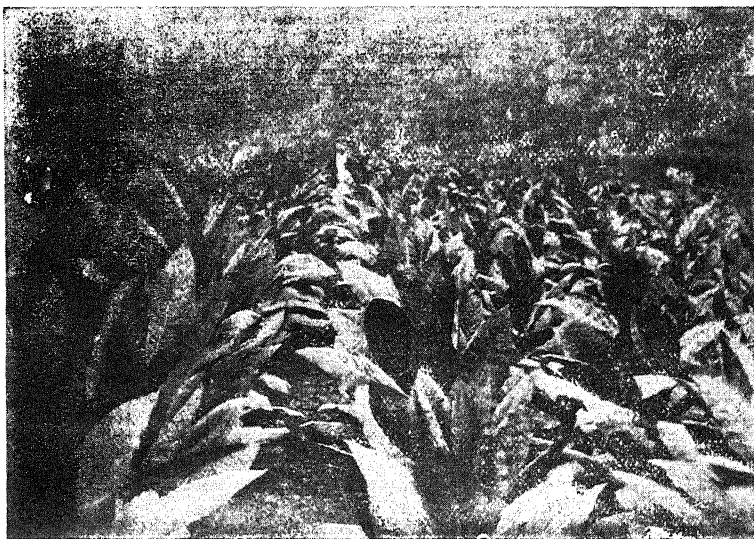
are by any means ideal, and it may very well be that more vigorous measures might have freed us from the disease more rapidly, but more vigorous measures would certainly have meant more vigorous resistance, with a possibility of failure in the end, through evasion of the regulations, so that much may be said in favour of a policy of making haste slowly, as there is no doubt that in a country with a comparatively small European and a very large Native population where police supervision is by no means abundant, the best results are most likely to be attained by the enactment of regulations which do not excite too great a feeling of antagonism on the part of those to whom they are applied while they are still sufficiently stringent to be effective.

"Now I am pleased to say the community generally realise the benefit to be derived from conforming to the policy of the Department, but in some sections the conviction has gained ground much more slowly than in others, and it is not altogether smooth sailing everywhere even now. It is, however, worthy of remark that generally speaking those districts which have sided most heartily with the Authorities are in a better position than those who have supported them less loyally.

"To-day the position of the Transvaal with regard to this disease is as follows:—

District.				Total Number of Infected Areas	Number of Areas removed from Quarantine.	Number of Areas still in Quarantine.
Barberton	...	...	...	39	17	22
Ermelo	...	...	1	31	16	15
Carolina	...	...	1	1	1	...
Heidelberg	...	...	...	1	1	...
Lydenburg	...	...	...	36	6	30
Marico	...	...	...	17	15	2
Middleburg	...	...	...	66	35	31
Piet Retief	...	...	...	86	14	72
Pretoria	...	...	...	74	74	...
Rustenburg	...	...	...	59	41	18
Wakkerstroom	...	...	...	3	3	...
Waterberg	...	...	...	62	19	43
Witwatersrand	...	...	...	16	16	...
Zoutpansberg	...	...	...	321	122	199
Totals	...	...	...	811	379	432

"This, I think, is a hopeful state of affairs, but to attain it has involved many sacrifices on the part of the farming community, who have borne the greivous burden in a manner which reflects the greatest credit upon them. The central authority has also had its share of troubles and disappointments, and occasionally even now the central authority has a very warm time and comes in for a good deal of criticism, but in fighting a battle of this sort the interests of the individual must be subordinated



Connecticut seed leaf, not yet topped.



Vuelta Abajo (Cuba) Tobacco from newly imported seed.

TOBACCO CULTIVATION AT UMKWAHUMBI VALLEY.—II.

(See Article.)

to the welfare of the community and individual criticism is inevitable, but if the farming population and central authority in any Colony would only work together hand in hand and assist, that East Coast Fever can be driven back and can be stamped out not without expense and not without hardship but I think can be done, and I hope that the farmers of Natal will derive encouragement from the consideration of what has been done in Rhodesia and what is being done in the Transvaal, and that they will turn a deaf ear to those who call out for the abolition of restrictions. With united effort success is certain, and I simply decline to believe that the Natal farmer is less public-spirited and less self-sacrificing than his neighbours in Rhodesia and the Transvaal, and I would therefore urge those who are here to-day not to lose heart because the present outlook is gloomy, but to see to it that Natal does not lay down its arms to this disease."

It is a question of co-operation, Mr. Gray concluded. They were all doing the best they could, individually, but they were all following different lines. A little more unity was essential. Unless the farming community was prepared to put up with a little hardship they would not make any progress in the eradication of the disease.

Mr. Gray's address was received with applause; and questions were then invited.

In reply to various questions, Mr. Gray said that the fencing of infected areas and farms was the means they adopted to repress the disease. They fenced farms in belts, so that they were breaking up the infected areas, dealing with one area at a time. They had not pinned their faith particularly to dipping in the Transvaal. In the early stages of the disease they all looked to dipping as a means of ridding the country of the disease. The Government had put up dipping tanks in various parts of the country, and in these tanks all transport cattle were dipped every fourteen days; but their own experience showed them that when once they had an area thoroughly infected they could not hope for very much protection from dipping. Dipping certainly did kill ticks, but the trouble about all dips was this, that they would not prevent ticks from attacking animals again a few days after the animal had been dipped. The tick only remains on the animal for four days. Thus they did not in Rhodesia compel the adoption of dipping. He did not decry dipping. It had many advantages. A great deal of good could be done. His own idea was that if a man gets his farm infected he was certain he would derive very little benefit by dipping. If they kept dipping up long enough they would reduce the numbers of ticks very materially. Not only did cattle harbour ticks, horse and sheep and other farm animals also harbour them. All the animals must be dipped. They fenced in the larger number of Native locations in the Transvaal. They had concentrated the cattle, and they had branded very largely, particularly in

the infected areas. Through this system of branding, they were now able to trace illicit movements of stock.

Colonel Crompton wanted to know whether if there were a Dipping Act in force, it would be of benefit to the Colony.

Mr. Gray asked if they could carry it out. Dipping the cattle on a farm for twelve months would not rid it of ticks. They must dip their horses and other stock as well.

Colonel Crompton said he had not heard of a single case where consistent dipping had not barred the entrance of the disease.

Mr. Gray asked if the farms which Colonel Crompton had in mind were fenced.

Colonel Crompton: Yes.

Mr. Gray said that was the explanation.

In reply to a question as to what policy the Government ought to adopt in regard to dealing with East Coast Fever, he said he had given the experience of the Transvaal, and he would like to see the people of Natal act on somewhat the same lines. Asked, further, if stamping out would do, he said it certainly would. As regards the spread of infection, he said that in all the cases which had come under his notice such spread had been traced to the movement of stock and to nothing else.

Continuing, he said he did not consider there was any danger in moving cattle over clean farms, provided proper precautions are taken. Single fences were sufficient. They had had considerable experience in the Transvaal, and that was his opinion. They could move an infected animal thirty or forty miles. The ticks were not infected so long as the temperature is normal. As regards fencing, an amount was placed in the Estimates for the purpose in the Transvaal. Loans were made to farmers and were repaid by instalments. In the Native locations the Natives themselves paid for the fencing done there. All laws dealing with East Coast Fever should, he certainly thought, apply equally to Europeans and Natives. They had had very little trouble with the Natives in the Transvaal.

A vote of thanks having been moved and passed unanimously to Mr. Gray for his presence there that night and for his trouble in answering all their questions, the debate on the resolution *re* East Coast Fever was resumed.

Mr. Moon asked whether the Government could find the money to carry out a policy of stamping out. He advised farmers to go in for dipping. (Hear, hear.)

Mr. King said that the Colony had spent a large amount of money, and they had all failed. Now they must suggest something new. He accordingly moved that, in the opinion of the Union, uniform laws should be made for Europeans and Natives alike; that there should be no movement of stock; that there should be destruction of infected

stock, with adequate compensation; that compulsory dipping should be enforced; and that negotiations should be entered into with the adjoining States with a view to combined action in dealing with the disease.

One delegate thought that the fencing of infected areas should also be provided for in the motion.

Mr. Deane pointed out that there was no need to include anything in regard to fencing. They had the law and the means for fencing, which could be taken advantage of by any farmer.

Mr. Marriott did not consider that the present methods were sufficient. There should be compulsory fencing, for white and black alike—(hear, hear)—and he wanted to see a strong resolution on the subject.

Mr. Scott said that Mr. Gray had emphasised the necessity for fencing. Every infected area should be thoroughly fenced.

Another delegate considered that the point *re* compulsory dipping should be deleted.

Mr. Mitchell thought that they should emphasise the necessity for dipping. But they must have the solid support of the Government, and the Native should be treated like the European. (Hear, hear.) As regards fencing, the Native locations were a great danger. Cattle on the unfenced locations were repeatedly passing from them to the neighbouring farms. There was also danger of illicit movement of stock through Native locations and unfenced farms. There was not adequate white supervision. They must have branding of cattle throughout the Colony. (Hear, hear.) As regards movement of stock, the suggestion of the Minister of Agriculture would bring hardships on the farmers.

Mr. Deane repeated the explanation he had made that afternoon. It was of no use suggesting the enforcement of dipping on Native locations, for what was the good if they could not carry it out? Stoppage of movement was absolutely necessary. (Hear, hear.) In regard to branding, the Government's experience had been very unfortunate. The Native guards were quite unreliable. When branding was enforced in the locations there was a panic among the Natives and much movement of stock, causing the creation of new centres of disease. He was endeavouring to obtain concerted action with the other Colonies. They did not know what stamping out involved.

Mr. Blaker asked whether they had sufficient money. He recommended systematic dipping. (Hear, hear.) He spoke strongly in favour of the Advisory Boards, through whom they could do a lot in the way of dipping.

Mr. Deane said that the Advisory Boards could do a lot in the way of dipping. They should enforce it among farmers who could afford it.

Mr. Marwick said that there would be no difficulty in getting the Natives to dip their cattle. His experience had been that they rather wanted to dip too often and go too far. His farm was almost clear of

ticks. Every animal of every description was dipped. He agreed with the Minister of Agriculture in his decision as regards movement of cattle. Every farm should be fenced. (Voice: "You can't do it!") They could do it: farmers must be brought to it, and they would do it.

Colonel Leuchars asked whether the Advisory Committees had had absolute control. The Government handed over the responsibility to the Advisory Board, yet harassed them. (Mr. Deane: Give an instance.) He blamed the Government for their present position. He had not heard of a single case where the disease had broken out where dipping was in force.

The President asked, as it was late, if they could not now put the motions to the meeting.

A resolution to adjourn was lost.

Mr. Mitchell said the Minister ought to tell them what was to be done with regard to Native locations.

Mr. Deane asked what parts of the Native Trusts had not been fenced in. If any areas were not fenced in he would apply the Compulsory Fencing Act. (Cheers.)

Mr. Fleming said that the machinery at present in existence was quite sufficient. He said that they would have the greatest difficulty in enforcing a Compulsory Dipping Act. The Government had done a great deal, and they were not given the credit that was due to them. Fencing was *the* great thing, and dipping came next.

The Chairman pointed out that there was already a permissive Compulsory Dipping Act.

The Conference adjourned at 10.30 p.m.

Mr. B. B. Evans, in resuming debate on the second day, remarked upon the measures for the suppression of the disease which had been adopted in the Transvaal. He considered that Natal should follow the same lines. He did not think it possible to inaugurate a proper stamping out system on account of the Natives. Isolation and fencing, and also dipping were what was required. (No; and hear, hear.) Every man should be compelled to keep his cattle clean.

Mr. Green recommended the appointment of one central elected Advisory Board only of six members for the whole Colony, to work in conjunction with the Department of Agriculture, and he moved the addition of such a provision to Mr. King's amendment.

Mr. King agreed to the addition.

Mr. Newmarch expressed himself in favour of entirely stopping the movement of cattle and dipping.

Mr. Hosking moved as follows, as a further addition to Mr. King's amendment:—

"That, in the event of the Government having made no satisfactory announcement by the 31st May next, to the effect that the other Colo-

nies have agreed to stamp out infected and in-contact herds jointly with this Colony on a satisfactory basis, our President shall be requested to call his executive together to confer with the Government regarding their future plans, and if he thinks necessary to call a meeting of this Union."

Colonel Crompton thought it would be better if Mr. Green's addition to Mr. King's amendment were put forward as a separate amendment. As regards dipping, he said that those who had spoken against dipping had not practised it.

Mr. Deane hoped that Mr. Green would see his way to withdraw his resolution, for the other Colonies had stipulated that, if they joined Natal, they must be represented, and that Council would act as an Advisory Board. As regards dipping, it would be absurd to apply the Act throughout this Colony. (Hear, hear.) If the Advisory Boards would look after the matter of dipping in their districts he would back them up by the application of the Compulsory Dipping Act where necessary.

Mr. Green withdrew his amendment regarding the establishment of a Central Advisory Board.

Mr. Gray said that, with reference to the way in which the high veld of the Transvaal had been cleared of the disease as compared with the low veld, it was not a question of altitude, but it was due to the fact that on the high veld the farms were occupied chiefly by Europeans who were amenable to regulations, whereas the low veld consisted chiefly of farms occupied by Natives. There lay the difficulty.

It was resolved that the vote be now taken.

Mr. Scott, replying as the mover of the original resolution, said that he had moved his resolution in order to introduce the subject, but now that they had Mr. King's definite proposals before them he was willing to withdraw his resolution.

Upon the Conference agreeing, the original motion was accordingly withdrawn.

The Chairman suggested that before putting Mr. King's motion to the meeting they should hear the opinion of Mr. Gray, the Principal Veterinary Surgeon of the Transvaal, on the East Coast Fever question in Natal. (Hear, hear.)

Mr. Gray said that one of the most important means of checking the spread of the disease was by branding, which would prevent illicit movements of stock. Their experience in the Transvaal had been that a reliable influential Magistrate had no difficulty in inducing the Natives to brand, so long as each Native had his own particular brand. The Government did not wait for the disease to appear: they branded throughout at once. In the case of illicit movements the owners were punished and the cattle destroyed. He wished to point out that branding was a really important factor in preventing the spread of the disease.

Mr. Power, upon request, then spoke. He was pleased to find that the advice given by Mr. Gray had borne out the advice given for years by the Natal Veterinary Department. As regards dipping, the success which had been experienced by many farmers, and referred to by Col. Crompton, in keeping out the disease, was not entirely due to dipping, but to the fact that other essential precautions, such as fencing and strictly keeping their cattle on the farms, had been taken. He agreed with Mr. Gray that branding was one of the best weapons they had in checking the movement of cattle and so the spread of the disease. He referred also to the matter of locating outbreaks. They should know more about the existence of outbreaks than was at present the case. He did not decry dipping. It was necessary for people to take precautions to get rid of ticks, and even if no East Coast Fever existed dipping would still be necessary in a country like this. (Hear, hear.) He pointed out the difficulties attending the enforcement of any dipping regulations. "It is only the stock-owners who are keen on dipping that will make a success of it; they will use suitable dip at proper strength, etc." He spoke of the necessity for reporting deaths, and it was being seriously considered whether it would not be advisable to make all deaths notifiable to the Veterinary Department. As regards stamping out, this was a very tall order, on account of the number of cattle involved. First, they must locate all the outbreaks, and get the areas fenced and the cattle branded. He certainly would not like to recommend off-hand stamping out as at present no one knew the extent of infection in this Colony. Outbreaks which had been in existence for months and not reported were coming to light daily. The Veterinary Department was, therefore, not in a position to say what number of cattle was involved. It was essential to locate all outbreaks, fence, brand and stamp out where such were indicated.

In reply to a question, Mr. Gray said he would not advocate double-fencing, as he did not consider double-fencing necessary.

Mr. King's motion was then put to the meeting, and passed unanimously.

The Conference then proceeded with the election of officers for the forthcoming year.

(To be continued.)

Don't let the sheep manure go to waste. It strengthens and fertilises the soil better than any other.

Tobacco-Growing in Natal.

SOME INTERESTING PICTURES.

THROUGH the courtesy of the Managing Director of the Natal Tobacco Plantations, Ltd. (Mr. J. M. Hull) we are enabled to reproduce in this issue some photographs of tobacco fields, which we think will prove of considerable interest to all tobacco growers. Most people are, of course, aware of the existence of the Natal Tobacco Plantations, Ltd., but few are aware, perhaps, that the Company's property in the Umkwahumi Valley, Beaumont, covers some 2,350 acres. The portion of the valley of the Umkwahumbi River lying in the Camperdown Division has proved to be specially suitable for the growth of fine quality tobaccos; and it is interesting to note that the Company has already taken many first prizes and nineteen prize medals in open competition at the different shows in Natal for several years in succession, capturing the gold medal at the Durban and Coast Society of Agriculture and Industry last July for the special collection of pipe, cigar, and cigarette tobaccos and manufactured products, cut and roll tobaccos, cigarette tobacco, cigars, cheroots, coringas, Swiss cigarillos, etc.

The photographs which we reproduce represent only a few of the tobacco fields. Other fields now growing contain types of Yellow Leaf tobacco for cigarettes, such as Hester, Goldfinder, Virginia Oak Hill, Broad Leaf Orinoco, Yellow Pryor and Turkish, besides other varieties for cigar binders and fillers.

The first photograph of Plate I. of the series depicts Improved White Burley tobacco crossed by Havana Seed Leaf. The photo was taken just before being topped. This tobacco is growing on new land on the company's farm "Scawfell," with special tobacco fertiliser, mixed with blood meal, and will yield a tobacco suitable for best cigars, in flavour equal to the best Mexican tobaccos. The second picture on the same plate shows another cross of White Burley—a long and broad leaf—almost ready for reaping. This is also grown at "Scawfell," and will be suitable for superior pipe tobacco. The colour is a rich saffron, and has a soft and silky texture, grown with imported fertilizers as an experiment for comparison with local manures.

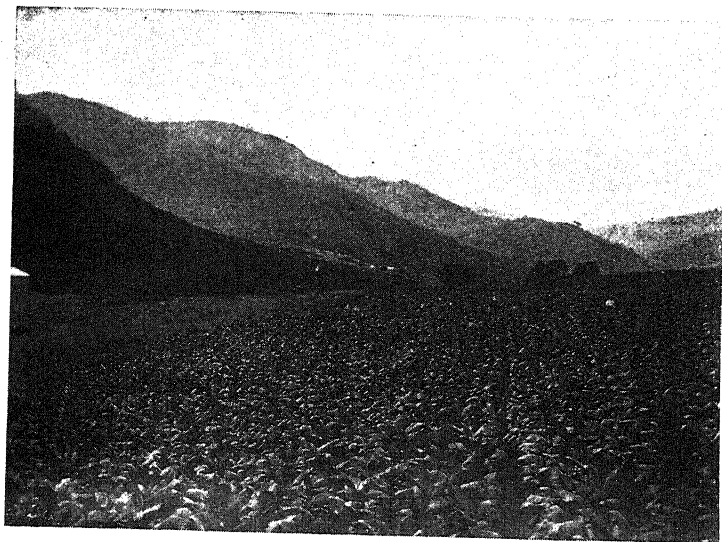
On the second plate we see, first, a portion of a field of Connecticut seed leaf, not yet topped. This crop, grown from acclimatised seed, is a first one on newly-broken land with rather poor soil. No manure has been used on this field. A prolific growth is shown, with great uniformity of leaf, which is fine in texture and suitable for cigar wrappers. The second picture is of a field of Vuélta Abajo (Cuba) tobacco, from

newly-imported seed, grown on the company's farm "Skiddaw" with special tobacco fertiliser. This is the seventh crop of tobacco in succession off the same land. The photo shows the plants in the suckering stage—an abundant crop, suitable for cigar wrapper.

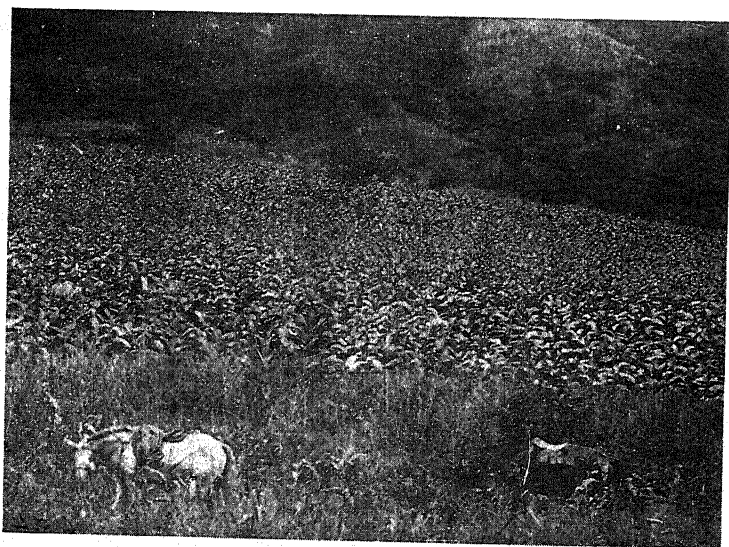
The first illustration on the third plate shows a third successive crop of Sumatra tobacco for cigar wrapper. This is a portion of a 25-acre field, manured with a specially prepared fertiliser. This field, for which acclimatised seed was used, has shown results beyond expectation. (A general view of the Umkwahumbi Valley is here seen, the river winding in and out around the base of the surrounding hills.) The last picture is of a twenty-five acre field of White Burley ready for reaping. This represents a first crop of tobacco from an old mealie field manured with special fertilisers. A heavy yield of fine pipe tobacco of uniform quality and prime flavour is expected from this.

We have had the pleasure of sampling a number of cheroots and cigars and some pipe tobacco grown in the Umkwahumbi Valley, which were kindly sent to us by Mr. Hull, and the flavour and burning qualities are excellent. We were particularly interested to hear from Mr. Hull that the cigar wrappers were actually grown on his company's estate and not, as is the rule, imported from Sumatra. Samples of wrapper leaf sent by Mr. Hull to us were of fine texture; and we must also refer to the splendid appearance of the samples of cigarette tobacco also sent.

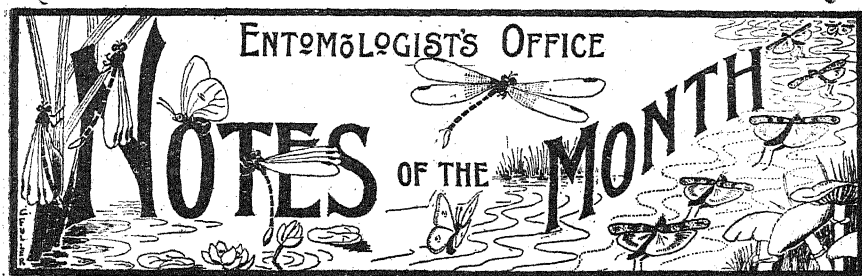
The following ration has been found most serviceable for milking cows at the Trinidad Government Farm. The animals, in addition to being grazed on the pasture area of the Farm, were given mixed rations of artificial foods, of which the following is a good example: 1 lb. cotton seed meal, 2 lbs. coconut meal, 2 lbs. pollard, 1 lb. crushed mealies, and 1 lb. dried ale grains. The total cost of this daily feed amounts to no more than 35s. This is a very nutritious mixture and one rich in nitrogenous constituents. When fed in conjunction with a good proportion of pasture grass, or other bulky fodder, consisting largely of carbohydrates, fibre, etc., the whole forms a diet well suited for sustaining a good flow of milk. The cows were also given 1 lb. of molasses per head per day, and 1 oz. of salt was added to the daily ration of each animal.



Sumatra Tobacco for Cigar Wrappers—third crop in succession.



A twenty-five acre field of White Burley ready for reaping
 TOBACCO CULTIVATION AT UMKWAHUMBI VALLEY.—III.
(See Article.)



Orchard Notes.

MAY.

The Citrus Orchard.

THE beginning of May will see the commencement of the busy season among the citrus orchards, especially those in the coast belt. In drawing particular attention to the notes and advice given in these notes for last month, I wish to make a further appeal to citrus growers to destroy all fallen fruit regularly, and also to see that mouldy fruit hanging upon the trees is collected and destroyed. I can only say that if this work is done systematically, and done well, its benefit to the individual will be very great indeed. The two insects—the fruit fly and the moth—which puncture citrus fruits, attack all kinds of oranges, naartjes, mandarines and common or rough lemons. The former stabs the rind to insert its eggs within the tissues of the fruit, the latter deposits its egg upon the skin, and the young caterpillar bores it way into the fruit. Fruit attacked by either of these pests colours prematurely and falls early to the ground; but very often before it falls it becomes mouldy, the fungus following the track made by the insects. More particularly does the fungus attack follow upon that of the moth, but the same state of affairs not infrequently follows puncturing by the fly. These account for the mouldy fruit found hanging upon the trees. Again, any fruit injured by thorns or scratched by dead pointed twigs or pecked by birds, is equally liable to go mouldy before dropping. Of course a fallen fruit becomes almost at once a propagating bed for the blue mould; even if it escapes injury it is immediately attacked by scavenger insects which make it ready for invasion by the mould and other organisms setting up decay. Both the fly and the moth spend their pupa stage in the soil and soon escape thereinto unless the fruit is quickly removed.

Beyond all other things blue mould is the cause of decay of citrus fruits in transit, and is synonymous with the word “wastiness.” It gains an entrance to the fruit through skin injuries, mostly sustained in pick-

ing and handling the fruit in the orchard, and because of the way mouldy fruit is allowed to abound almost the slightest injury renders it liable to decay setting up sooner or later.

For getting rid of this insect-infested and mould-multiplying fruit, a simple expedient, recommended because it is the most likely to be adopted, is to prepare pits about the orchard, preferably outside the boundaries, about 6 feet deep and 8 feet square. The fruit is gathered daily and deposited in the pit, and at least once a week a compact layer of soil 4 to 6 inches in thickness is laid over the fruit. The object of this layer of soil is to prevent the emergence of any fruit-flies and moths coming to maturity, and this precaution must not be neglected. If the fruit is gathered regularly, covering once a week is estimated to prevent the escape of all flies and moths; but, when a collection of fruit is made, some of which may have been lying on the ground for several days, such, of course, should be covered with soil immediately.

There will, I presume, be a good deal of fruit sent from Natal to our neighbouring Colonies, and so sight must not be lost of the regulations governing scale-insect infested fruits and the presence of more than 4 per cent. of mouldy fruits. The Transvaal regulations against mouldiness caused a good deal of heartburning last year, but the careful picker and packer really has nothing to fear from its operation. Let him pick his fruit in the proper way—not trusting it all to his coolie servants—sweat or cure it for a few days, and then pack it carefully and it will not go bad in transit.

Packing citrus fruit cannot as yet be described as an art in which our citrus growers have acquired any remarkable degree of proficiency, but I hope to see much greater attention paid to proper methods of packing this season. Last year I saw a number of private consignments on the wharves for shipment to Cape ports and even to London, and I must say that they were wretchedly packed. For shipment to Cape ports the fruit was, or at any rate appeared to have been just tumbled in, and little system seemed to have been displayed in the case of that for London which was sent forward in boxes.

Fruit for the neighbouring Colonies should certainly be sized and packed properly, and growers should at once learn the principle of packing upon the honeycomb arrangement. The advantages of this system are: 1. The fruits all help to hold one another in place, and even if one or two break down the "pack" is not readily displaced; 2. More fruit can be got into the package than by any other arrangement, so that a full, honest parcel is supplied to the buyer.

It depends upon the dimensions of the box and the size of the fruits just what arrangement of the fruit gives the best pack, and, whilst rules can be laid down for certain sizes of fruits for boxes of a known dimension, whilst each grower has his own particular style of box he will

have to experiment a little to find out what arrangement and spacing of the fruits gives the best pack.

LEMONS.

As the main crop of lemons will shortly be coming on—by lemons I am not referring to the common, but to the smooth-skinned varieties—a word or two about curing will not be out of place this month. Lemon culture and lemon marketing is, perhaps, the least understood of all branches of fruit-growing in Natal, and I only know of two growers who go about their business in anything approaching the proper way.

To supply a first-class quality lemon the grower must pick his fruit whilst it is still green and, generally speaking, about $2\frac{1}{2}$ inches in diameter, and colour it up and cure it under cover. I have been told that such a procedure “is all nonsense,” and I have been told “it is contrary to Nature.” As far as Nature is concerned she does not give us all her products for our purposes in a perfect state by any manner of means, and in few industries more than fruit-production has man improved more upon Nature. Left to herself, she produces a coarse, thick-skinned fruit of no value except for its peel. If the fruit is picked green and still comparatively small it is picked at a stage when its juice is at its maximum and its acid contents at the best, and it is greatly improved by being cured and coloured up artificially. The colour acquired is rich and the rind thins and toughens, so that the fruit can be held for months without decay setting in. In picking the lemons eternal vigilance must be taken to prevent all injuries to the rind, and gloves for the pickers are a great advantage. This care is necessary because if the rind is injured the fruit will decay from mould attack. As with oranges and naartjes the stalk must be short, leaving only the calyx. They should be packed into large, shallow boxes or trays. These are built into stacks in a cool room and not further disturbed, except to remove any that may go mouldy, whilst curing and colouring up. Lemons cure well in a well ventilated, cool room so long as they are kept out of a direct draught.

Of course there is always something to be learned in curing lemons to perfection, and the grower who goes about the matter with his eyes open will find out what curing house conditions are the best to secure.

GENERAL.

The fall working of orchard-lands should not be delayed any longer. If the soil is well cultivated and stirred it will retain the moisture of the summer rains and be all the more easily worked in the spring.

The rat-like vlei moles which are getting so troublesome in many up-country orchards, are driven thereto, as a rule, by the burning of the veld and encouraged to remain by the presence of grass. These creatures not only make a warren of the orchard, but do considerable mischief by ringbarking the trees.

In order to protect trees from these pests the best plan is to tie a band of sacking about the base of the trunk. The soil should be removed for a couple of inches and the bandage, 8—10 inches wide, applied and tied. The soil should be replaced. Not being climbers, the creatures will not injure the bark higher up, and although burrowers I have never known them to attack the bark of the roots; therefore, the bandage will give the tree sufficient immunity from their attacks. The best treatment for trees barked by these vermin is to apply a poultice of fresh cow-dung, and the sooner it is applied after the injury is done the better the tree heals.

Slow acting manures, such as kraal manure and compost, may now be applied to the orchard and incorporated with the soil; but, of course, rapidly acting fertilizers should not be applied until the spring.

Where the leaves are all down the pruning of pears, plums, apricots and cherries may be taken in hand. Remember that heavy pruning induces wood growth and is generally only necessary in bringing young trees into shape and renovating old trees. Trees in bearing only require a light winter pruning. Be careful to burn all prunings, as they harbour the spores of fungus diseases. It is still too early to prune grapes, and peaches are best left as late as possible.

Arrangements should be made to give all deciduous trees a good winter-spraying with Bordeaux Mixture. I do not know any deciduous fruit tree that does not require this winter-spraying in Natal. Pears require it for leaf-spot, peaches for curl and black-speck, apricots for black-speck and shot-hole fungus, plums for shot-hole fungus, and apples for fusicladium and ripe rot. Grapes also require winter treatment.

The spores or seeds of all our fungus troubles of fruit trees are carried through the winter on the bark, and their control by spring-spraying is out of the question unless these have been preceded by thorough winter work. Unfortunately, the rule is to forget all about these troubles until they have practically completed their mischief in the summer.

Where pineapples are subject to frost they should be protected by covering with dry grass, reeds or hay. It is to be noted that pines under clean culture are less subject to injury by frost than those amongst which weeds are growing.

COLLAR ROT.

In the January issue of the *Agricultural Journal* of Victoria there is a particularly interesting note by the Government Viticulturist, Mr. F. de Castella entitled "The Orange in Eastern Spain," from which the following extract is taken:—

"The most remarkable peculiarity in connection with the cultivation of citrus fruits in the Levante is the system of growing the trees over a hole, with the collar and starting point of the main roots exposed to the air.

This system is very generally followed. It was at the Granja Valenciana (Experimental Station and School at Valencia) that I first remarked this curious method, but all the orange trees which I saw subsequently were treated in the same way."

"The accompanying photograph shows this clearly. The tree is reared, budded, and planted in the usual way, and until about three or four years old is treated much as we would do in Victoria. By this time its surface roots have become sufficiently strong to support it; a hole is dug underneath it and the tap root is entirely cut off with a saw."

"The hole, which is a foot or so in diameter, and of about the same depth, is not filled up. It remains always open, any dirt or rubbish which may fall into it being regularly removed. When irrigating, which is usually done by flooding, a small dam is made around the tree at a distance of a couple of feet from it to prevent water from getting into the hole. The appearance of these trees is very striking; their bases may be compared to large spiders sitting over holes in the ground. The object of the treatment is to prevent collar rot and gumming (*Mal de Goma*), which used to be prevalent, but now seem to give little trouble. The sour orange stock is the one usually employed, even for lemons; lemons worked on lemon stock are said to be liable to *Mal de Goma*."

"The trees struck me as being very healthy. They were loaded with an abundant crop of fine fruit; in fact, everything seemed satisfactory excepting the price."

ARMY WORMS.

Last month (March) saw a recrudescence of the army worm which it will be remembered, appeared in February of 1908, after having been unnoticed in the Colony for the very long period of 30 years.

Notification of outbreaks were received from such scattered parts as Hillcrest, Bergville, Mid-Illovo, Nel's Rust and Mfogosi (Zululand). It is to be noted that these are not the areas from which the insect was so generally reported a year ago, a phase in agreement with the American experience that the insect is rarely destructive in the same locality in two successive seasons. This fact is no doubt due to the migration of the adult moths being greatly influenced by air currents.

This year I have not heard so much about the pest being hatched out of hailstones; but, with regard to the old Boer tradition that the advent of the black caterpillars precede the disappearance of the locusts, it is at least interesting to note that this summer the locust invasion—taking the Colony as a whole—has been the lightest for ten years past. It is to be hoped that this reappearance of the pest is but some further evidence of the return of "the good old seasons" and the departure of the locust!

Fortunately, the army worm gives no promise of assuming the economic importance which it merits in North America, nor does it

appear likely to do so, being subject to many natural enemies, chief amongst which is a parasitic fly which deposits her eggs upon the body of the caterpillar, and the larvæ of which feed upon the juices and tissue.

Measures for Control.—Where the worms have already attacked the crop, but little can be done. In level veld, they might be destroyed by means of rollers, beating with wire flails, etc.

When the army is on the move, however, cultivated fields in the line of march should be protected by a ditch, or the ploughing of two or three deep, parallel furrows, with the smooth, perpendicular side of the furrow facing outwards towards their advance, will prove quite an efficient barrier to the further progress of the worms. Finding it impossible to scale the perpendicular wall they turn and crawl along the furrow in search of some easier ascent, and the digging of holes in the furrow at some little distance apart has been recommended. The caterpillars, tumbling into these, may be readily destroyed, either by crushing or with paraffin.

The spraying of a strip of veld in front of the advancing army with a strong and very sweet solution of locust poison would, I think, be attended with very satisfactory results, whilst an application of the less caustic arsenite of lead to a few rows of the crop on the side nearest to the impending attack is suggested as a further safeguard.

Remember that a little spraying will save a lot of fruit.

Buy a good cow every time you can get her at a reasonable price, but buy a good bull every time regardless of price.

The skin of a healthy hog feels mellow and soft, and the coat appears heavy, smooth and glossy. However, the skin and coat of a healthy animal are subject to a great deal of variation because of the surroundings and care. When the coat is thin, irritation from the sun and dirt may greatly change the appearance of the skin. An inelastic, hard, rigid, scurvy skin, and a dry, thin, rough, harsh coat indicate an unthrifty, unhealthy condition.—*Robert A. Craig, D.V.M. ("Diseases of Swine.")*

Science and the Farmer.

NOTES BY FARMING EXPERTS.

* * * Under the above heading we propose to publish each month in future short paragraphs on subjects of interest to the practical farmer, by recognised experts in agriculture and allied sciences.

PROPER tillage has two important effects. First, the soil is brought into a desirable condition . . . , so that there will be a deep, mellow, but firm seed and root bed to absorb and store the rainfall and to prepare plant food, and, second, the loss of water by evaporation from the soil is prevented as far as possible.—*George H. Failyer.*

There are several factors to be considered in determining the proper stage at which a crop should be cut for hay. Chemists tell us that hay made from young growing plants is more digestible and contains more protein per pound than hay made from more mature plants. If hay is cut early, the percentage of protein is greater; if cut later, the percentage of protein is less, but the yield of dry matter in pounds is naturally increased.—*Byron Hunter.*

IRRIGATION AND DRAINAGE.

Good drainage is essential for a permanently productive irrigated farm. It is practically impossible to supply crops with sufficient water for the best growth without applying so much that some will seep into the subsoil. Unless this can flow away it will raise the level of the ground water until it comes near the surface, where it will cause an accumulation of alkali and will drown out crops. If land has not good natural drainage it must be supplied artificially, but this need not be done until a few crops have been raised.—*S. Fortier.*

MILKERS AND MILKING.

Too many milkers regard the work of milking as a dirty and disagreeable task. The work has resolved itself into nothing more than the manipulation of the udder, and is to be hurried through with as quickly as possible. The element that takes from all drudgery its unpleasantness is wanting. That element is thinking along lines tending to improve the work. In the processes that attend the milking of a cow there is enough to cause the milker to study seriously the work that leads up to a making of a perfect pound of butter. Milk as it is drawn from the udder is nearly free from bacteria. Could it be kept in this condition it would keep for many hours before any perceptible change would take place.—*Edwin H. Webster, M.S.*

LUCERNE.

Lucerne should be kept as free as possible from grasses and weeds at all times, and every spring, after the second year, it should be harrowed or raked very deeply: this will make the plants grow vigorously. A top-dressing of compost manure, or of vegetable ashes, soot, or any other enriching matter, should be applied every second year, immediately after a mowing; and a dressing of lime, chalk, or gypsum should be given in the other years. A plentiful sprinkling of liquid manure after a mowing of the lucerne is much to be recommended.—*Martin Doyle and John Darton* (*"Cottage and Dairy Farming."*)

GETTING RID OF WEEDS.

A good crop on the land, aided by good tillage, will keep down all weeds . . . If the farmer occupies only half the surface of his field with oats, the other half is bound to be occupied with mustard or wild carrot or pigweed; but if his land is all taken with oats, few other plants can thrive. So, a weedy farm is a poorly farmed farm. But if it does get foul and weedy, then what? Then use a short, quick, sharp rotation. Keep the ground moving or keep it covered. No Russian thistle or live-for-ever or jimson-weed can ever keep pace with a lively and resourceful farmer.—*L. H. Bailey* (*"The Principles of Fruit-Growing."*)

EGG-FERTILITY.

An egg receives its fertility from the male bird, but the condition of the female at the time of laying has much to do with the hatching quality of the egg . . . The laying hen must be healthy and properly fed or she cannot produce an egg capable of carrying the germ to a successful hatch. Hens kept in unhealthful quarters or too closely confined are not likely to lay eggs that will produce strong, healthy chickens, if indeed they produce any whatever. Hens suffering from disease or infested with vermin may lay, but eggs from such hens will rarely hatch, and even if they do hatch the chickens will not be likely to mature into vigorous or growthy fowls. Hence in order to secure hatchable eggs the hens must be healthy, have plenty of outdoor exercise, and be fed upon an assorted or balanced ration. An exclusive corn [maize] diet will not make for fertility. Fowls in confinement must have a mixed diet and plenty of grit and bone, with meats, clovers, or other substances in the line of nitrogenous food. They must be kept free from lice and must have plenty of litter, straw, hay, chaff, or leaves in which to scratch. Fowls having free runs need less attention to diet and are more apt to lay fertile eggs than fowls closely imprisoned.—*Richard H. Wood, M.D.*



SPANISH SYSTEM OF GROWING ORANGE TREES.

By the adoption of this system, the collar and the starting point of the main roots of the tree are exposed to the air.

(See "*Orchard Notes.*")

Division of Agriculture and Forestry.

NOTES ON THE MONTH'S WORK, MARCH, 1909.

IN compliance with a suggestion emanating from readers of the *Journal*, it is proposed to prepare a short monthly digest of reports from the various branches of the Division, and in this way to render immediately available information from all sources likely to be of value to the farming community, as well as such news as may be acceptable to students, ex-students, members of the staff, and others directly or indirectly interested in our undertakings.

SCHOOL OF AGRICULTURE AND FORESTRY.

The House Master, Mr. C. W. Williams, B.Sc., reports that two new students came into residence on the first of the month, bringing the numbers up to 44. Mr. W. S. Ladell, the newly-appointed Analyst, arrived on March 23rd, and immediately took up his duties as Lecturer in Agricultural Chemistry. Good progress has been made with the second of the new bungalows, which on completion will bring our accommodation up to a limit for 50 students. A debate was held on the evening of the 26th, under the auspices of the recently-established Scientific and Debating Society, the subject being that "the horse is more suitable than the ox for draught purposes in South Africa." After a keen debate the motion was lost by 18 to 24 votes.

BIOLOGICAL LABORATORY.

Mr. T. D. Davidsen, who assumed office as Biologist on 4th January, furnishes the following report, covering a period from that date to the end of March:—

My appointment as Lecturer in Biology created a new office in your division and thus there was very little provision for carrying on some branches of my work. Two serviceable microscopes with accessories, some biological instruments, and a plentiful supply of stains and reagents were available. With these I was able to investigate some plant diseases, to mount preparations, and dissect plants and insects preparatory to the opening of the session on January 16th, when my tutorial work commenced.

The arrangement of the biological laboratories has taken up some little time. I have devoted one room to microscopy and office work, another to bacteriology, and a third to seed-testing, and as soon as the apparatus now requisitioned comes to hand I can undertake to do reliable work. I have gathered together some specimens of plants and insects and

hope to build up an economic museum and herbarium, which will help the students considerably in their studies.

My lectures involve (1) The Study of Insect, Fungus, and other Pests of the Farm, Forest, and Orchard; (2) The Study of Bacteria in relation to the Dairy, Stock, and Tillage; and (3) The Study of Plant Life and Work, both in the Field and in the Laboratory. The students on the whole have displayed a keen interest in my lectures and demonstrations, and I have to thank many of them for much assistance in the collection of material.

The late Analyst resigned about the close of the last session, and, pending the arrival of his successor, I delivered a number of lectures in elementary and advanced agricultural chemistry.

Much of my time during the period under review was necessarily taken up in the perusal of journals, reports, pamphlets, and leaflets pertaining to agricultural work, past and present, in South Africa. In this connection I have to thank Mr. C. P. Lounsbury, Government Entomologist, Capetown, Mr. D. Gunn, Acting Government Entomologist, Pretoria, and Mr. Claude Fuller, Government Entomologist, Maritzburg.

I have visited the Government Museum several times, and am indebted to the Director (Dr. C. Warren) for the loan of books and for not a little information. I also visited the Government Bacteriological Laboratory at Allerton, and have to acknowledge the loan of books and bacteriological apparatus by the Director. Mr. A. Goule, M.R.C.V.S., has kindly provided me with blood smears from African Coast Fever cases, also with specimen slides of the organisms concerned in other diseases. To Mr. Medley Wood I am grateful for help in connection with the identification of plants.

Facilities for the testing of seeds is an urgent necessity in order that farmers may be protected from fraudulent merchants or dealers. To secure the finest grades of produce the seed must be pure, genuine, and of high germinating power and uniform germinating energy. In the report (1907-08) of the Transvaal Department of Agriculture I find mention of the detection of a commercial sample of *Paspalum* seed offered at current prices which had a germinating power of 3 per cent., *i.e.*, in a short ton there were only 60 lbs. of seed capable of growth; a sample of lucerne offered at 1s. 6d. per lb. possessed a germinating capacity of 15½ per cent., *i.e.*, 310 lbs. of living seed in a short ton. Comment would be superfluous!

The presence of impurities in seed samples is a source of danger. Troublesome weeds and parasites like dodder and broom-rage are often introduced to a farm in impure seed samples. Many weed seeds are so light that a small percentage of impurities by weight may mean a lot in numbers. To cite two cases in the U.S.A., one per centum of impurities

represented 3,000 weed seeds per lb., and in another sample a two and a half per centum of impurities corresponded to 27,600 weed seeds per lb. Inert impurities such as dead seeds, chaff, husks, sand and dirt are often present. In such cases the difficulty can be overcome by sowing extra seed, as can also be done with a sample of low germinating power when it is free from weed seeds, but the price of the seeds must be in proportion to the value. Again, if the finest grades of produce are to be secured the seed must be true to type. The presence of "rogues" destroys uniformity. If some private arrangement between the Department and the seed merchants could be arrived at, seed samples could be forwarded for testing, and on the result of the examination such seeds could or could not be recommended to farmers. A mutual arrangement of this kind works very well in the Transvaal, Mr. Godfrey Munday, of the Agricultural Department there, informs me.

Further experiments in connection with the inoculation of the seeds of lucerne and other legumes are desirable. There is reason to believe that on a raw soil such as an intake of virgin veldt, or on a soil which has not carried a crop of legumes, profitable results will ensue. The nitrobacterine of Prof. Bottomly, of London, and the nitrogen of Dr. Kuhn, of Munich, now on the market, have both in special cases been successful. Mr. A. D. Hull, in a letter to the London "Times," states that as a result of two years' trials at Rothamsted Experiment Station the inoculation of seed and soil has nothing to recommend it. Conditions are different in Natal as the greater part of the land has never grown legumes and cannot therefore contain the nodule organisms. I repeatedly examined the yellow lupins (*Lupinus luteus*) which were ploughed down for green manure. The seed had been inoculated, but I failed to find nodules in the roots or nodule organisms in the roots. Dr. Schultz at his farm at Lupitz obtained very good crops after inoculating and ploughing down lupins, and this practice initiated by him is now known as the Lupitz method. It has been very successful on the light sandy soils of Germany.

The relation between the supply of organic matter in the soil and the rate of nitrification is a subject which deserves close investigation.

Of the imported grasses now grown on the farm I find that Paspalum, Phalaris, Cocksfoot, and Italian Rye Grass promise well. At present good stools of these grasses are in evidence. Bahama grass (*Cynoden doctylon*) is worthy of a trial both as a fodder grass and for lawns and close swards. I have made some observations and collected some facts relative to the habitat, mode of growth, and development of some of the native grasses, and have in hand the investigation of the influence of veldt burning on the quality, botanical composition, and durability of the herbage.

The kindly co-operation of all the other members of the staff has aided me not a little in carrying on my work.

ANALYTICAL LABORATORY.

In the interval elapsing between the departure of our late Analyst, Mr. A. Pardy, who has taken up an appointment in Scotland, and the arrival of his successor, Mr. W. R. S. Ladell, the division has been indebted to the Government Chemist, Durban, for an examination of samples, of which an immediate analysis was required. Buyers of wattle bark are very generally adopting the practice of purchasing on an analytical return, and this work now bulks largely in the routine of the Laboratory. In response to numerous enquiries for average tannin contents, the following table reflects the results of examinations completed during the past season. It will be noted that the coast wattle is at little or no disadvantage when compared with that from the midlands of Natal, which fact, when connected with the very promising growth of plantations

Return showing percentage of Tannin contained in various samples of Wattle Bark submitted for analysis.

Northern Districts	Midlands	Coast	Zululand	Eastern Transvaal	
28°22	29°02	33°86	31°44	36°7	
...	25°44	33°56	27°20	...	
...	28°02	31°03	29°58	...	
...	28°42	22°80	37°54	...	
...	32°78	36°25	...	...
...	30°23	35°96	...	...
...	29°35	33°46	...	...
...	35°02	31°39	...	...
...	30°63	...	...	...
...	29°90	...	...	...
...	30°75	...	...	...
...	25°61	...	...	...
...	35°07	...	...	...
...	32°15	...	...	...
...	31°00	...	...	...
...	25°31	...	...	...
...	41°94	...	...	...
...	37°68	...	...	...
...	36°63	...	...	...
...	35°76	...	...	...
...	38°09	...	...	...
...	36°42	...	...	...
...	37°41	...	...	...
...	37°04	...	...	...
...	35°56	...	...	...
...	34°40	...	...	...
...	33°95	...	...	...
...	35°55	...	...	...
...	35°39	...	...	...
...	34°14	...	...	...
...	33°73	...	...	...
...	33°56	...	...	...
...	28°71	...	...	...
...	25°09	...	...	...
28°22	32°64	32°29	31°44	36°7	Averages.

at Mount Edgecombe and Winkel Spruit, should afford a stimulus to planting in this belt. Of 34 samples of bark from the midlands, 13 have shown a tannin content exceeding 35 per cent., which should be regarded as a minimum for mature and carefully conserved crops. One sample, substituted by the Town Hill Wattle Co., gave a return of 41.94 per cent. It is suggested that, when feasible, bark from branches and younger wood be separately handled, as its presence in a sample submitted for valuation has frequently reduced the average content to an unsatisfactory figure.

CROWN FORESTS.

The Chief Forest Officer, Mr. G. H. Davies, reviews operations during the past month in our Crown Forests in the following report:—

“One result of East Coast Fever is a great activity in fencing: a permanent improvement that must benefit the Crown forests even if not actually put up on forest boundaries. When fencing is required on the latter the department is usually called upon to share the cost, and though Government property is exempt from such an obligation—which would obviously impose a serious burden upon the Colony—it is, in the case of permanent forest reserves, desirable to agree when funds are available. Nothing else will stop cattle entering bush in winter, and to obtain revenue from impounding is but making the best of a bad job. Fencing will not stop illicit wattle-cutting, but it makes it more difficult and assists in the capture of the thieves, and immensely aids the Crown Foresters—with their vast areas in charge—in controlling timber-felling operations.

With regard to timber, purchasers are increasing and there is every evidence that if transport became plentiful the trade would revive rapidly. I think the indications are in favour of wholesale work, which is, of course, far more in harmony with forest conservation than the desultory demand of the small sawyer. A quarter of the value is allowed to the purchaser of a whole section certainly, but then the purchaser in return takes all the marked timber in it, good and bad, and so clears the section thoroughly. If the Forester does his duty in such a case, the section should be left in the best condition for regeneration so as to produce a better crop of timber than before.

I was assured lately by a practical business man engaged in store-keeping, farming and wattle-planting that donkeys of good size are better than mules for transport and bush-work. He has gone in for them, and says that each of his will do as heavy work as an ox and more quickly; besides which there is the advantage that they will breed and so obviate the continual purchases to replenish stock necessitated by the use of mules.

Natives are now requiring wattles and poles for the ever-recurring erection of store and living huts. In Zululand Forester Vanderwagen

reports the taking of 309 bundles from the Entumeni and Acting Forester Buntting 319 bundles from the Nkandhla and Qudeni forests, all without any payment into revenue. The result of this permission to cut free of charge in Crown forest reserves as well as in Native reserves must be to give trouble in proportion to the length of time during which it is allowed after land-settlement by the Delimitation Commission. A "prescriptive right"—or a whole series of such—is being established to make the term "forest reserve" meaningless.

Forester Meyer, of Luneburg, has been visiting the forests reserved as Crown forests on farms in the Northern Territories, and warning natives not to cut in same. At Ngomi a timber section is in process of being marked after a good search for a locality by Forester Foster: the most accessible parts of this forest having been destructively worked out years ago.

The opening of marked sections for timber-working is of little practical use perhaps just now, but at all events, it proves that we are willing to sell timber. There seems to be some misunderstanding on this point, one gentleman lately complaining that the Natal Crown forests were not "open." As a matter of fact there are not only marked sections in numerous forests, but we are willing to mark others in any Crown forest, bearing sufficient timber to be worth a timber merchant's enterprise, in the Colony on receipt of a business-like proposition. The latter, however, does not include wild-cat schemes requiring the Department to give long credit and all sorts of concessions, with the certainty of endless trouble in maintaining control of people "working a dead horse." Neither does a business proposition cover the marking of remote bushes for the selection of a dozen trees by a person—European or native—wishing to put in a little spare time at it: for such there are marked sections open at the principal forests, where the Forester can supervise without riding a day's journey to do so. Let a man, however, after examining a forest in a responsible way, offer to buy all trees marked in it, good and bad as they come, at the very reasonable rates in Proclamation 58 of 1903, and it is worth while marking in any forest, however distant from a station. The cost of such a section may be from two hundred pounds, but I have no doubt but that you would be willing to allow payment in instalments provided that proper security was offered. To such timber-working all the Crown forests of Natal are "open."

I suppose that our bushes present as great a mixture of species as any in the world—which is one of the obstacles to the thorough clearing of the sections. Nevertheless there is generally a predominant tree in every part of every forest, usually yellowwood, but sometimes ironwood, sneezewood and so forth. The trees other than yellowwood are mostly plentiful in small areas of a bush, however, and thus it is inconsistent with good forestry to attempt to meet a demand for any special kind of

timber. The merchant must be prepared to take all sorts as they come, and do the sorting out for different markets himself.

Forester Purser remarks upon the thick growth of young sneezewoods on the upper side of the Ingelabantwana Forest, near Bulwer, and Forester Foster upon the profusion of the Ngomi "waterwood" seedlings in one part of that forest, where buck were thinning them in the best possible manner. Forester Fernando notes the quantities of the sweet-scented yellow flowers of the climber *Senecio deltoides*, in the Emkazení near Riverside, which he has also seen as a rapid verandah climber. Should plants be required of this or any other wild species—herb, shrub or tree—his address is "P.O., Riverside, Natal-Cape Railway." *Clematis brachiata*—our wild clematis—is another pretty creeper now in flower. Forester Fernando sold another lot of 100 indigenous transplants during the month. Forester Foster took an interesting photograph of the flowers of the Bush Willow (*Combretum kraussii*), a copy of which I sent to you.

Forester Symons states that the large troops of eland are now breaking up into small groups. He considers that one of the Berg passes into Basutoland might be passable to them, but that the rains have not much affected the barriers made by the Basutoland Government. I am now requesting him to report upon the alleged scattering of the eland by the calf-hunts of last year, but should think that such a result would have been noticed before this. You will remember that he was conscious of the possibility at the time, and that he moderated the hunting in consequence.

Both Forester Foster, of Ngomi, and Forester Mason, of Preston, Mooi River, note the great activity of bees during March—due, as the former says, to the necessity of making up for time lost during the heavy rains. The latter quotes a curious native belief about baboons: that they tie cobs to the long hair of their chests in order to increase their carrying capacity when plundering a mealie field! Forester Mason has been trying to find out where the natives buy the traps they set all over the bushes, but the local storekeepers cannot remember.

Forester Moller reports a plague of caterpillars at Normandien, destructive to the veldt, which is in places black with them. Locusts are not mentioned in the March reports, but since, I hear of a large swarm settling on the Ngomi Forest trees, and I am asking Forester Foster for further details. Forester Green, at Ngoya, Zululand, reports the passage of hundreds of locust birds towards the Lower Umfolosi—circumstantial evidence of the plague existing over there.

Forester Chilvers had a case of heavy timber felling on Crown lands by a European who supposed it was part of his farm and pleaded guilty. The Magistrate, however, refused a conviction, but the land has been

shown to be Crown land. Other contraventions of Proclamation 58 of 1903 have been numerous but not serious.

Forester Purser reports the honour of visits to his station of the Principal Under Secretary and the Postmaster-General. The former expressed himself pleased with the Marutshwa Forest, and I wish that he could have seen some of the more heavily timbered forests, such as the Impetyene or the Xalingena.

Weather reports are nearly all of rain, though not so heavy as in February. The exceptions are at Imbizana, in Alfred, and Empangeni, in Zululand, where it was dry. At Giant's Castle a storm washed out trout and scale-fish in the Bushman's River.

AFFORESTATION.

The Chief Afforestation Officer, Mr. Stayner, furnishes an interesting itinerary of a journey through Southern Zululand, undertaken in connection with inspection duties and the reservation of forests in the Port Durnford area for a general scheme of settlement in that district.

"On Friday, 19th March, I left Maritzburg by the Greytown Road, and reached New Hanover the same night, calling at Goodall's (late Cordeux), at York, to purchase seed if possible. I found the gardens, which used to be the best in the midlands, an overgrown wilderness, but with many good species extant. *Cedrus deodara*, of which I hoped to obtain seed, has been swamped in the struggle for existence, and only dwarfed specimens remain. Of Araucaries, *A. brasiliensis* is immediately available and *A. cookii* will be later. Seed of *Pinus palustris* is also ripe and papers requesting authority to purchase will be submitted to you in due course. Quite a number of other kinds of trees were seeding, but seed is either on hand here or can be purchased from Europe at rates that local people would not care to collect for. *En route* at two farms I passed through I was asked to identify plants and trees. The next day I reached Greytown and then Krantzkop. Here I found a nice lot of trees grown from transplants supplied by the Department in 1904 and planted by Mr. Newmarch. On the 22nd I rode to Untunjambili and from there on to the Tugela, which I crossed at Middle Drift, and at night reached Nkomo. The next day I pushed to Empandhlani *via* Sibudeni and the Nkandhla Forest. At the Nkandhla Magistracy the Clerk of Court asked for a supply of trees for the Government Buildings there, which I informed him could be sent if application was made through the usual channel. The day following I reached Saunders' farm, Vlakbuilt. He has a very fine property, and I went thoroughly over his plantations with him. They are extensive and he is working them on the right lines, though they have been sadly neglected by the previous owner. By Thursday I was at Melmoth and on Friday at Eshowe, where I stayed till the evening, and then rode to Evtusheni in the moonlight. My horse, owing to the long journey through the Nkwaleni Valley, was not capable of a long

trek this day. On Saturday I arrived at Messrs. Hudson and Williams' farm at Mtunzini. Their tree-planting does not appear to have met with a large measure of success; fired by the example of the Campbell plantations at Mt. Edgecombe they are very keen on wattle planting. I have persuaded them to carry out tentative experiments only, as I think success somewhat hypothetical. At Empangeni black wattles have failed. From Mtunzini, by the courtesy of Inspector George, of the Natal Police, I was provided with a guide and went through the afforestation reserve west of the line and crossed the Umhlatuzi at the lower drift and reached Empangeni the same night."

Starting from Port Durnford Station on Friday, 2nd inst., I struck straight for the coast and beyond the spot marked Kraal Hill (on which I could not find the beacon indicated as placed by Altern), and over the hill came immediately on typical "Umdoni" (*Eugenia cordata*), swamp bush, the predominant species being mixed with "Umsengabusi" (*Cussonia* sp.), "Umblahla" (*Sideroxylon inerme*), "Umfogafoga" (not identified), "Umgworya" (*Odina caffra*), "Eboqua" (*Barringtonia racemosa*), and "Nokahlu" (*Tabernaemontana ventricosa*); the bush extends towards the Umlalazi mouth, widening considerably as it nears the river. Leaving for Saturday the examination of the wide end of this bush, I proceeded coastward, past a square hut belonging to a native, Matwa by name, and for a time found sparse stunted specimens of "Umhuhlu" (*Trichilia emetica*), interspersed with plants of "Wild Medlar" (*Vangueria edulis*), "Umdakaan" (*Apodytes dimidiata*) and "Umsinsi" (*Erythrina caffra*). Near the coast the bush thickens and is made up of many species, the foregoing, excluding those mentioned as forming the Umdoni Swamp, are represented by "Isikupa" (*Kaussia floribunda*), "Ipahla" (*Brachylaena discolor*), "Makaya" (apparently a species of *Mimusops* not unlike "Umnweba" (*M. caffra*, the Red Milkwood), "Umnquai" (*Celastrus pedicularis*), *Rhus* sp., "Umquoquana" (*Olerodendron glaberrimum*), "Efaam" (not identified), and "Inkamaga" (*Striptizia angusta*). This latter is not present in sufficient quantity to be worth exploitation for fibre as on the South Coast. At the littoral edge of the forest *Phylica* takes possession and just above high water mark an *Ipomea* asserts itself. *Asparagus sprongori* is plentiful within the bush and "Hluhlur" (*Dalbergia armata*) is present; it is from this climber the natives work rustic chairs and tables that are hawked in the towns. I reached the coast opposite the wreck and then after an examination of the coast line of bush northwards struck inland and reached the railway at 109 mile post. The bush near this is an extensive one and runs N.E. from the line and is unapproachable in many parts owing to swamps, and is, as far as a hasty inspection allows me to say, Umdoni. It is full of monkeys. Natives have been cutting timber, poles and wattles in the coast strip and also in the Umdoni bush, and in the one near 109 mile

post have cut steps up some of the trees on which Lycopods and Angraecums are growing in order to obtain them for medicinal use. Walking to Mtunzini by the railway line, as far as the failing light allowed, I noted that by the 1,100 rise and fall there is a belt of Umdoni bush, and also that near 105 mile post at the bridge is a strip consisting of "Esfubo" (*Ficus sp.*) and "Ebcqua" (*Barringtonia racemosa*), the former being predominant.

Here and there along the line are plants of *Strychnos spinosa*, the seed of which are so deadly, though the pulp is relished by the Bantu races wherever the plant grows. The second day I crossed the Umlalazi in a boat above the "Ncema" (*Cyperus natalensis*) bed and found the bush to consist of "Umlolwa" (*Hibiscus tiliaceus*) and "Umungamanzi" (*Acacia caffra*) near the water's edge, and of "Mkakaya" and "Umdakaan," with here and there a large "Umgwenya" integrally. Having no bush knife or axe I was unable to penetrate far, the undergrowth being very thick, and rowed up the river, landing at intervals of about a quarter of a mile, and, except that the Hibiscus and Acacia dropped out, no change of species seemed to occur. About three-quarters of a mile from the mouth of the river I tied up the boat and went through the dunes and came on to the end of the bush first examined on Friday, and found it to have changed somewhat in character, being more of a saline type, "Umdoni" still being present, but "Esfubo" and "Eboqua" predominating. From this forest I proceeded to the shore, passing Utulela's kraal, and took up my examination of the belt of bush which was a continuation of that seen the previous day; it is similar and rather weak in places. All the lands between the patches of bush have a good number of "Ilala" (*Hyphaene crinita*) on them, but the old stems are being rapidly destroyed by their use in the manufacture of "Usuya" palm wine. Plenty of seeds of this species of palm, which are valuable as vegetable ivory, are still available, but every stem tapped for its sap reduced the quantity, and of course prevents the natural regeneration which occurred prior to the wholesale destruction now taking place.

In the absence of the Chief Afforestation Officer on duty, his assistant, Mr. T. R. M. Pole, reports in connection with afforestation work at Cedara:—

"The main work has been preparing and planting of the remaining 50 acres on the hill-side with black wattle. The young plants are now showing well above ground, and promise to get a good hold before the winter frosts set in.

Every alternative line in *E. macrorhyca*, *E. polyanthema*, *E. hemiphloia*, and *E. leucoxydon* sections have been felled and the poles stacked on the outside of the plantations. Several young plantations have been heeded.

A belt of seventeen lines of *A. melanoxylon*, with a total of 3,315

plants, has been planted along the boundaries of the new area fenced for afforestation.

A section of about half an acre of wattles was stripped for experimental purposes. Rough frames with movable sections were erected on which the bark was hung to dry.

The ten students allotted to this section of the Department for the month have had instruction in various work, including felling, stripping, planting out, potting, hedge-making, etc. A collection of trees has been set aside in the Nursery, with labels bearing the botanical and vernacular names, for the benefit of the students in classifying the different species, and some of them were not slow in availing themselves of it, as you will notice by the results of the examination held on the last day of the month, papers of which have been submitted to you previously.

The hedge of *Pinus halepensis* in front of the farm manager's house has been rooted out and replaced by one of *Callitris australis* (Oyster Bay pine), which should in a short time be a great improvement on the original.

Assistant Tarboton left Cedara on 25th for Empangeni, where he takes up his duties as forester in the place of Forester Clark, who has resigned his position in the Department.

Three heavy storms have been experienced during the month and nasty washes have occurred in newly planted land on the side of Main Avenue. Drains have been deepened and others will be constructed to carry off all flood water.

The maximum temperature registered in the Nursery was 88 degs. and the minimum 46 degs., the means being 74 degs. and 53 degs. respectively.

A case of fence-cutting has occurred at the back of farm, the particulars of which were reported to you earlier in the month. I understand that legal proceedings are now in progress and there is every hope of the culprit being brought to account shortly.

CENTRAL EXPERIMENT FARM.

The results from an early crop of potatoes planted to determine the relative value of blood-meal as prepared at the Government Abattoir by Mr. Merritt have been submitted and afford useful information.

Eight plots, each of an area of a quarter acre, were planted in October on the hill-sides below the garden with sprouted cut tubers of Up-to-date variety. The manures, as reflected by the following table, were placed in the drills and lightly covered with soil by means of the anti-clog weeder before the sets were planted. Each two manure plots were separated by two unmanured rows to better define the results. The crop was harvested during the last week of January.

MANURE EXPERIMENT WITH POTATOES (BLOOD MEAL).

			Manures.	Yield of Marketable Potatoes, lbs.
Border $\frac{1}{2}$ Plot = 6 Rows—No Manure			...	612
Plot I. = 12 Rows.			100 lb. Complete (Tobacco) Fertiliser	2,100
" I.(a)	2 "		No Manure	210
" II	12 "		50 lb. High-grade Superphosphate	1,513
" II.(a)	2 "		No Manure	174
" III.	12 "		50 lb. H.G. Super, 25 lb. Potash Chloride	2,140
" III.(a)	2 "		No Manure	236
" IV.	12 "		50 lb. H.G. Super, 25 lb. Blood Meal (Sun dried)	1,390
" IV.(a)	2 "		No Manure	207
" V.	12 "		50 lb. H.G. Super, 25 lb. Potash, 25 lb. Blood Meal	2,063
" V.(a)	2 "		No Manure	224
" VI.	12 "		25 lb. Potash, 25 lb. Blood Meal (Sun dried)	1,264
" VI.(a)	2 "		No Manure	201
" VII.	12 "		50 lb. Blood Meal (1) (Sundried)	1,185
" VII.(a)	2 "		No Manure	144
" VIII.	12 "		50 lb. Blood Meal (2) (Kiln dried)	1,267
" VIII.(a)	2 "		No Manure	216
Border, $\frac{1}{2}$ Plot, 6 "			No Manure	519

WEENEN IRRIGATION STATION.

From this centre have been received the season's results of a series of experiments in the cultivation of lucerne, which supply answers to a number of queries received through the post during the past year from planters.

MANURE AND CULTIVATION.—LUCERNE, 1908-9.

Plots 130 of an acre. Planted 7-3-06. Yield in lbs. per acre, dry weight.

Plot	Treat-ment	Manures	Quantity and Dates Harvested					Total
			16-10-08	26-11-08	28-12-08	5-2-09	17-3-09	
Border	C. —	—	lbs. 420	lbs. 540	lbs. 480	lbs. 420	lbs. 330	lbs. 2,190
39	C. M.	Super. 390 lbs, Pot-ash 150 lbs. ...	780	1,410	1,380	1,230	930	5,730
40	C. M.	Super. 390 lbs. ...	1,020	1,470	1,290	1,080	810	5,670
41	C. —	—	450	660	750	600	450	2,910
42	C. M.	Potash 150 lbs. ...	270	510	780	840	690	3,090
43	C. M.	Slag 390 lbs. ...	600	750	750	780	570	3,450
44	C. —	—	300	630	930	690	540	3,090
45	C. M.	Bone Dust 390 lbs.	510	750	840	630	480	3,210
46	C. M.	Lime 990 lbs. ...	600	570	780	510	420	2,880
47	—	—	390	420	720	660	600	2,790
48	C. —	—	330	690	870	690	630	3,210
49	— M.	Super. 390 lbs. ...	1,050	1,800	2,580	2,220	1,500	9,350
50	C. M.	390 lbs ...	960	1,530	2,280	2,310	1,590	8,670
51	— M.	Slag 390 lbs. ...	750	780	1,200	960	810	4,500
52	C. M.	390 lbs. ...	480	1,050	960	870	930	4,290
53	—	—	510	450	570	480	330	2,340
54	C. —	—	570	660	450	390	390	2,460
55	— M.	Bone Dust 390 lbs	630	660	660	450	420	2,820
56	C. M.	390 lbs.	570	570	750	570	510	2,970
57	—	—	330	510	630	480	360	2,310
Border	C. —	—	420	540	660	480	360	2,460

DISTANCE OF PLANTING AND DRAINAGE SECTION.—LUCERNE.

Plots half an acre. Planted 12-4-07. Yield in lbs. per acre, dry weight.

Plots	Distances	Quantity and Dates Harvested.						Total for Sub-Plots	Total for Plots
		15-10-08	19-11-08	21-12-08	19-2-09	1-3-09	7-4-09		
A { Undrained Tile Drains Stone Drains	{ 1½ feet Rows }	lbs. 876 1,158 1,140	lbs. 1,470 2,352 1,866	lbs. 1,446 2,334 1,824	lbs. 1,560 1,770 1,590	lbs. 1,260 1,620 1,392	lbs. 810 1,122 870	lbs. 7,422 10,356 8,682	lbs. 26,460
B { Undrained Tile Drains Stone Drains	{ 2 feet Rows }	456 528 516	1,026 930 822	966 882 738	1,302 1,320 1,146	1,176 1,206 960	798 1,008 846	5,724 5,874 5,028	16,626
C { Undrained Tile Drains Stone Drains	{ 1 foot Rows }	600 894 846	1,392 1,482 1,452	1,314 1,416 1,266	1,806 1,896 1,638	1,764 1,830 1,572	912 1,428 1,122	7,788 8,946 7,896	24,630
D { Undrained Tile Drains Stone Drains	{ Broad- cast }	810 1,068 1,038	1,746 2,352 1,866	1,644 1,716 1,818	2,208 2,460 1,740	1,812 2,364 1,482	924 1,296 1,080	9,144 11,256 9,024	29,424

LUCERNE.—QUANTITIES OF WATER EXPERIMENT.

*Plots 1/15 of an acre, sown 23-7-07, in 24 drills 12 in. apart, with 13 lbs seed to the acre.
Result obtained from middle 12 rows of each plot, in lbs. per acre, dry weight.*

Plot	15-10-08	19-11-08	21-12-08	25-1-09	10-3-09	Total	Quantities of Water	Manures Applied
Border	lbs. 600	lbs. 750	lbs. 660	lbs. 540	lbs. 510	lbs. 3,060	None	
1	2,040	2,550	2,220	2,100	1,860	10,770	None	390 lbs. Superphosphate 300 lbs. Chloride of Pot- ash per acre.
2	1,890	2,610	2,280	2,190	1,980	10,950	2 in. every month	
3	1,470	2,550	2,370	2,040	1,770	10,200	2 in. every fortnight	
4	2,100	2,940	2,850	2,400	2,190	12,480	2 in. every week	
5	1,950	3,210	2,940	2,820	2,430	13,350	4 in. every month	
6	2,010	3,330	2,970	2,730	2,370	13,410	4 in. every fortnight	
7	1,950	3,030	2,130	1,890	1,740	10,740	4 in. every week	
8	1,980	2,880	2,670	2,460	2,310	12,300	6 in. every month	
9	2,100	2,850	2,640	2,340	1,530	11,460	6 in. every fortnight	
10	2,520	3,750	3,510	3,060	2,820	15,660	6 in. every week	

LUCERNE.—VARIETY EXPERIMENT.

Planted 23-7-07 in drills 12 in. apart. Plots 1.15 acre. 24 rows in each plot.
4 varieties of 6 rows each. Yield in lbs. per acre, dry weight.

Plots	Varieties	Quantities and Dates of Harvesting					Totals	Manures per Acre	Water
		15-10-08	19-11-08	31-12-08	1-2 09	17-3-09			
11	Turkestan	lbs. 300	lbs. 405	lbs. 420	lbs. 345	lbs. 270	1,740	390 lbs. Bone Dust 150 lbs. Ch. Potash	4 inches every fortnight, unless heavy rains experienced.
	Hardy	345	615	1,065	930	855	3,810		
	Poitou	360	540	1,470	1,110	915	4,395		
	Province	405	600	915	855	690	3,465		
12	Turkestan	345	450	450	390	255	1,890	390 lbs. Super. 150 lbs. Ch. Potash	
	Hardy	480	645	1,155	1,020	855	4,155		
	Poitou	420	585	810	660	705	3,180		
	Province	585	705	1,065	945	1,050	4,350		
13	Turkestan	270	480	480	315	210	1,755	390 lbs. Slag 150 lbs. Ch. Potash	
	Hardy	330	810	1,200	1,080	1,065	4,485		
	Poitou	375	600	690	585	570	2,820		
	Province	450	825	975	870	765	3,885		
14	Turkestan	300	570	555	420	285	2,130	780 lbs. Bone Dust 150 lbs. Ch. Potash	
	Hardy	480	690	1,110	1,035	810	4,125		
	Poitou	525	660	1,170	1,080	1,035	4,470		
	Province	510	720	735	645	600	3,210		
15	Turkestan	285	525	540	405	315	2,070	No Manure	
	Hardy	390	720	810	705	585	3,210		
	Poitou	345	645	720	615	540	2,865		
	Province	420	690	735	690	570	3,105		
16	Turkestan	300	600	465	375	225	1,965	780 lbs. Super 150 lbs. Ch. Potash	
	Hardy	405	735	930	855	735	3,660		
	Poitou	330	705	1,140	1,065	1,035	4,275		
	Province	450	825	960	840	690	3,765		
17	Turkestan	270	540	435	390	285	1,920	780 lbs. Slag 150 lbs. Ch. Potash	
	Hardy	510	720	1,095	990	900	4,215		
	Poitou	540	585	1,155	1,035	765	4,080		
	Province	495	660	750	705	630	3,240		
18	Turkestan	330	390	450	420	300	1,890	390 lbs. Bone Dust 300 lbs. Ch. Potash	
	Hardy	405	450	675	630	510	2,670		
	Poitou	390	465	645	585	465	2,550		
	Province	375	540	585	555	495	2,550		
19	Turkestan	300	375	450	360	270	1,755	390 lbs. Super. 300 lbs. Ch. Potash	
	Hardy	360	465	510	435	480	2,250		
	Poitou	330	390	450	405	360	1,935		
	Province	315	465	465	390	435	2,070		

LUCERNE—VARIETY EXPERIMENT—*continued.*

Plots	Varieties	Quantities and Dates of Harvesting					Totals	Manures per Acre	Water
		15-10-08	19 11-08	31-12-08	1-2-09	17-3-09			
20	Turkestan	210	255	420	345	240	1,470	390 lbs. Slag 300 lbs. Ch. Potash	
	Hardy	255	420	615	600	540	2,430		
	Poitou	240	360	525	480	435	2,040		
	Province	300	390	315	435	450	1,890		

WINKEL SPRUIT EXPERIMENT FARM.

Advertisements appearing in the local Press for large quantities of ground or monkey nuts have led to numerous enquirers as to methods of cultivation, yields and costs of production. The following report from our coast station is sufficiently encouraging to warrant the extensive adoption of this legume as a staple. The variety was an improved type recently imported from Florida and is very superior in yield and character to the local strains under native cultivation.

From 18-25ths of an acre 2,389 lbs. of dry nuts were obtained, an average of 3,307 lbs. per acre.

The actual cost of ploughing, harrowing, seed, weeding, banking up, digging, picking up, bagging, drying, sacks and manures amounted to £8 14s. 7d. per acre.

The nuts if sold at 8s. per sack of 70 lbs. would return £18 16s. per acre or a nett profit of £10 1s. 5d. per acre.

The variety planted were large Floridas, and these are being sold at present date for 12s. per sack of 70 lbs. to 80 lbs. in Maritzburg.

As in the case of other leguminous crops at this centre, the manures did not prove of any special benefit, the no-manure plots giving a better average yield per acre than the manure, with a consequently possible reduction of cost of cultivation.

This may be explained by the fact that these crops were grown on our old distance of planting maize sections, the land being uniformly manured for the past three seasons, and some residues would be available.

GROUND NUTS.

Planted 3-11-08 ; Harvested 27-3-09. Plots 1-25th of an acre.

Plots.	Manures.	Gross Plot Yields	Dry Nuts per plot	Yield Nuts per acre
		lbs	lbs.	lbs.
1	Superphosphate, 100 lbs. per acre.	1,190	143	3,575
2	No manure.	1,364	153	3,825
3	Basic Slag, 100 lbs. per acre.	1,095	149	3,725
4	Superphosphates, 200 lbs. per acre.	702	122	3,050
5	No manure.	759	130	3,250
6	Basic Slag, 200 lbs per acre.	737	134	3,350

GROUND NUTS—*Continued.*

Plots	Manures	Gross Plot Yields.	Dry Nuts per plot	Yield Nuts per acre
7	Superphosphate, 300 lbs. per acre.	821	154	3,850
8	No manure.	877	129	3,225
9	Basic Slag, 300 lbs. per acre.	780	134	3,350
10	Superphosphate 100 lbs., and Potash 22 2-9th lbs. per acre.	622	108	2,700
11	No manure	646	129	3,225
12	Basic Slag 100 lbs., and Potash 22 2-9th lbs. p. acre	756	124	3,100
13	Superphosphate 200 lbs., and Potash 44 4-9th lbs. per acre.	698	132	3,300
14	No manure.	946	162	4,050
15	Basic Slag 200 lbs., and Potash 44 4-9th lbs. p acre	550	121	3,025
16	Superphosphate 300 lbs., and Potash 66 2-3rd lbs per acre	547	113	2,825
17	No manure.	558	123	3,075
18	Basic Slag 300 lbs., and Potash 66 2-3rd lbs p acre	608	129	3,225

ONIONS.

Owing to planting the onions on a low lying piece of rather swampy land and the very wet season, the crop was not nearly so good as last season, nor were the tubers as sound.

From 1-5th of an acre 1,236 lbs. of onions were sold and 360 lbs. given to pigs.

The 1,236 lbs. sold realised £6 7s. 10d., or an equivalent to £31 19s. 2d. per acre. In addition to the above 70 lbs. were replanted for seed.

Considerations of space compel the retention of other data of interest from the orchards, dairy, poultry farm and apiary for a following issue.

E. R. SAWER,

Director, Division of Agriculture and Forestry.

Central Experiment Farm, Cedara,

20th April, 1909.

The size dose of medicine for stock varies according to the age and size of the animal and construction of the stomach. Animals having compound stomachs, as cattle and sheep, require larger amounts than do those with simple stomachs. A cow will need about twice as much and a sheep one-third as much as a horse. A drop is about equal to a grain; a teaspoon holds a fluid drachm; a dessert spoonful equals two drachms; a tablespoon holds a fluid ounce; a wine glass holds about two fluid ounces; a teacup holds from five to eight ounces; a tumbler holds from eight ounces to half a pint; and a pint contains twenty fluid ounces.—*Agricultural Journal*, Western Australia.

Farm and Garden Notes.

By GEO. CARTER, F.R.H.S.

FARM WORK FOR MAY.

Now that the maincrop varieties of the Highlands and the autumn crops of the midlands are ready for reaping, or, in the latter case, perhaps, already reaped, it is time to consider a few points which are likely to be of supreme importance during next spring and summer. Unless care in selection and storage is exercised now we are likely to be faced with a great scarcity of good seed in the spring, chiefly owing to the scare about "White rot." It is understood that the Government intend to adopt very strict measures of examination of all imported seed, far more strict than last year. The result of this will be that only a few merchants will care to risk importing, as nearly all imported seed is more or less infected with this same "White rot." French seed is probably the worst of all, every lot we saw last season showing infection after being stored a sufficient time to allow of development of the spores.

I may say candidly that I heartily welcome this action on the part of the Government, but not because I think we are going to keep out any disease (the scare has come ten years too late for that, and the various diseases scheduled are all over the Colony, and indeed all over every other Colony in South Africa, already), but because this restriction is going to teach us that we can quite easily save nearly all the money we have been sending oversea for so many years for imported seed. I am not going to contend that we can do without importing altogether. There may be times when it is requisite to get in really good new varieties from Europe, or when carelessness in selection has caused serious deterioration in seed here. But I have contended all along that the chief cause of the serious deterioration of seed potatoes is simply carelessness in selection, and careless growing, and not in the supposed fact that the potato will not naturalise perfectly, and even in the best conditions is bound to deteriorate in, say, six or seven years. It will be worth while finding out the cause of failure, now that we are cornered. First and foremost one comes to that worst fault of the Natal farmer—the craze for cheap seed, the biggest blunder, and yet the most general one, which any farmer can make. As long as he gets a seed potato at a cheap rate he cares very little about the quality of that seed. Size is quite immaterial. Purity and perfect maturation are of secondary consideration. Shape even does not matter. It must be cheap, and he must be able to plant an acre of potatoes for less than £5, manure included. This de-

mand has caused importers to import just what the demand is for—it will always have this effect—and some of the imported seed which has come into the Colony in recent years has been worthless rubbish which would have been thrown to the pigs in England. This is what the farmer has been buying as *imported seed to improve his crops and to replace what he thought was worn out seed*. Perhaps the same farmer has willingly paid £50 at the same time for an Australian ram! Can't you see that (as an old North of England saying has it) "Mice can't breed rats," and you can no more expect to get a really good crop of potatoes from poor seed than you can expect to get a pure bred Devon from old Afrikaner cattle. It does not *pay* anyone to import *choice* seed, because there is no demand for it. It costs more to produce it. It must therefore be sold for more. It will produce more, but that is what one cannot, somehow, convince the farmer.

Now this imported seed is supposed to last some five or six years. In most cases the farmer finds he cannot make it go so far as that; bastards get into it; the true shape vanishes; it deteriorates generally, and he must again import; more money wasted and sent oversea never to return. Yet I am sure that a little care in the handling of that potato crop would have resulted otherwise. The potato farmer in most countries, if he intends growing his own seed, defines a certain few lines of his crop and watches that section with most jealous eyes. If the variety should throw white flowers, and he sees one with a blue tint, that one must come out. If there is the slightest variation in shape or colour of leaf from the standard in any one plant that plant comes out at once. If, when a crop is lifted, any one root is of wrong shape that root is rejected. The sorting for seed is done by the farmer himself, or a very capable deputy, and then this choice seed is put carefully away in boxes or trays until such time as required for replanting. In short, if the potato is expected to keep true, and of the highest cropping power, it must have the same care and selection as any other seed crop; but how few farmers will go to this amount of trouble.

I think that we are going to discover that, with careful selection and exchange of seed from cold to warmer and from warm to colder districts, we are able to keep up the quality of our potatoes within the limits of South Africa. Men will arise who will make a speciality of seed growing and make a name for themselves. Early varieties will be grown under irrigation in the warmer districts of the colony so as to produce seed ready for planting in the uplands in November. Maincrop varieties will be found in certain districts to keep quite long enough to plant again in the November following the lifting; and so the Government, while seeming now to some people to be blocking the way, will be really making us more self-reliant and self-contained, and will be saving the Colony a great deal of unnecessary expenditure and waste.

In the meantime let each farmer who grows potatoes carefully reserve and choose his seed from the present crop, lest he should find later that good seed cannot be obtained at any price.

Onions.—The last sowing of maincrop onions should be made this month, both for the garden and farm, so as to have transplants ready for early spring. Where the area to be sown is large, seed may be put into the permanent drills, using about four pounds to the acre. For hand weeding the drills may be twelve inches apart; for horse hoe the space should be thirty inches.

The old, unnamed, white flat variety is still the general favourite with growers in the thorn country. Giant Rocca is the favourite in gardens, and has also produced some excellent field crops near Maritzburg. I have recommended some growers to try the Danvers Australian Brown. This variety is not large, but is very hard skinned and keeps much better than any other. Our greatest drawback in onion-growing is that we have not succeeded in producing a good keeper, perhaps because our maincrop is reaped during the rainy season, when the bulbs are bound to be too full of sap. A few experiments in well-built curing sheds would be very instructive.

HOME GARDEN.

Activity here is getting to its lowest ebb for the season, and only small successional crops, to keep up supplies of quick-growing vegetables, need now be put in. This is a good month for herbs of various kinds. Sowings may be made of Radish, Turnip, Lettuce, Peas, Spinach and Leeks. Many old gardeners in the midlands prefer this month for the main crop of Peas, saying that if sown now the flowers develop early in August, and thus escape the frost. Shallots and Horse Radish should now be transplanted. Artichokes will be ripe (the Jerusalem variety), and may be dug just as required for cooking.

In the flower garden successional sowing should be made of Marguerite, Carnations, Dianthus, Calendula, Candytuft, Phlox, Stocks and other items which will stand the frost. That glorious flower, the perennial Delphinium will bloom in October and November if sown now, in boxes, and put out in August. Sow Poppies for spring.

You should now make arrangements for pruning next month and early July, and complete the preparation of ground for planting fruit trees if this is not already done.

Sunshine, good bed and cleanliness are three important things in raising healthy calves.

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

AN interesting paper on "Milking Herds and Milk Records," which was read by Mr. H. M. Everard at a meeting of an English Farmers' Club, is published in the *Mark Lane Express* of the 1st March. Mr. Everard states that, in his opinion, the heaviest milkers are the Dutch and Crossbred Dutch on account of the long period during which they keep in milk. It is the animal that keeps in milk the greatest length of time that gets the best record, and not the animal that gives a large quantity for the first few weeks after calving and then dries off quickly.

With regard to the quality of milk, Mr. Everard states that in his experience the Dutch cows give equally as good milk as any other breeds, and, he adds, certainly more of it. He also points out the many advantages which are to be gained by keeping milk records.

"Fowl Cholera."

Colonel Pease, Inspector-General of the Indian Civil Veterinary Department, in the October (1908) number of the *Agricultural Journal of India*, records a discovery of much importance to poultry fanciers in the East. No more fatal disease than that hitherto known as "fowl cholera" is found in India. Quite accidentally, Conductor Dare at Mian Mir, while studying the surra disease in camels, ascertained by the use of the microscope that the death of some ducks from "cholera" was really due to a specific organism of the *spirochaetes* type. It is spread by the agency of the *Argas persicus*, or common fowl-tick, which it is difficult to destroy. The best method of dealing with it is to burn the old roosts and nests; but scraping the walls of the fowl-houses, painting them with hot coal-tar, and brushing the feathers of the birds with paraffin have been found efficacious. Now that the disease has been traced to this parasite, a suitable form of treatment will doubtless soon be discovered.—*Nature*.

Stable Manure.

The Maryland Experiment Station has recently issued a bulletin covering the work of Professors Talliaferro and Patterson, giving the results of two series of experiments, one of three years' duration and the other of seven years' duration, in the use of stable manures. The rotation utilised was maize, crimson clover, wheat, timothy, and clover hay, and the manures were applied once during the four year rotation at the

rate of ten tons per acre. The results favoured the use of fresh manure, applied directly from the stable, as against rotted manure, and the best results were obtained by applying the manure as long in advance of the time of the crop that was to use it as was possible. As between applying fresh and rotted manures before and after ploughing, the comparison of the results favour its application after ploughing as a top dressing. In regard to ploughing under in the fall and spring, the differences are slight, but in favour of allowing the manure to remain on the land during the winter and ploughing it down in the spring. The results favoured ploughing to a depth of seven inches, rather than one of five inches, while sub-soiling did not seem to indicate the repayment of its cost. The conclusion reached was that the amount applied, ten tons per acre in a four years' rotation, was not sufficient to maintain the productiveness of the soil, although one of the crops in the rotation was crimson clover, and, we presume, ordinary clover, as clover hay is the fifth crop in the rotation made hereinabove.—*Louisiana Planter*.

Effect of Food on Bones.

Bulletin 107 of the Nebraska Experiment Station gives the details of an interesting experiment showing how various foods affect the breaking strength of bones. On August 2nd, 1907, 20 pigs, averaging 120 pounds, were divided into five lots, and fed 22 weeks before slaughtering. The first lot had no grain but cornmeal; the second, 75 per cent. cornmeal and 25 per cent. wheat shorts; third, 25 per cent. cornmeal and 75 per cent. skim-milk; fourth, 90 per cent. cornmeal and 10 per cent. tankage; fifth, 90 per cent. cornmeal and 10 per cent. bone meal. Two days after butchering, the leg bones of these hogs were removed, cleaned and subjected to a careful breaking test in a machine made for such purposes. The bones were supported at the ends and pressure applied in the centre. The bones of those fed clear cornmeal broke easiest, and those with the 10 per cent. bone meal hardest. The least pressure required for breaking one of these leg bones was 460 pounds, and the one breaking hardest required 2,280 pounds. The average breaking strength of all leg-bones in the first lot, fed on cornmeal, was 702 pounds; second, cornmeal and shorts, 867 pounds; third, cornmeal and skim-milk, 1,279 pounds; fourth, cornmeal and tankage 1,361 pounds; fifth, cornmeal and bone meal, 1,505 pounds. The extreme difference in breaking strength of bones in the different lots shows that the skim-milk, tankage and ground bone each contained some substances for bone building in which corn was deficient. As the increased mineral matter in the bones is largely phosphate of lime, and as skim-milk, tankage and ground bone are all rich in this substance, it is fair to consider the phosphates in these foods as the determining factor in the building up of bones in pig growth.

Transport of Pineapples.

The Agricultural News (Barbados) in its issue of the 28th November contains an interesting article on Experiments in Fruit Export from Hawaii. The pineapple, it appears, is the chief fruit produced in the Hawaiian Islands, and nearly 3,000 acres have come under cultivation with this crop in the past few years. The trial exports of fruit have been attended with such a measure of success as to warrant the hope that the trade may undergo considerable developments in the near future.

The variety of pineapple largely grown in the Hawaiian Islands is the Smooth Cayenne, and it is a kind of very good flavour, although it does not ship so well as the Red Spanish pine, which is so generally grown in Florida, Cuba, and Jamaica. "The pineapple needs very delicate handling if it is to be shipped abroad, and liberal amounts of packing material should be used. The length of stem attached to pineapples on sending them off was seen by experiment to have an influence on their keeping properties. The fruits with stems from 2 to 3 inches long kept much better than those with stems only 1 inch or less in length. Fruit cut with long stems, and also wrapped in paper, showed an average saving of 22.37 per cent. of the whole over fruits cut with short stems and packed without paper."

Tick Eradication.

In Bulletin No. 81 of the Agricultural Experiment Station of the University of Tennessee, Mr. E. C. Cotton gives some interesting facts regarding the life-history and habits of the tick and their relation to exterminative measures. These facts are based upon a two-year exhaustive study of the tick under Tennessee conditions. He refers to the two general methods of freeing fields and animals of ticks: Pasture, rotation, and dipping and oiling, each of which is best adapted to certain different conditions. "The pasture-rotation method is most effective under general farm conditions, especially where a rotation of crops is practised. Dipping and oiling are best adapted to range conditions, where the stock is allowed to run at large. On large ranches, where considerable numbers of animals must be treated, dipping is practised, while oiling is best suited to a small number of animals, particularly where but one or two milch cows are kept."

Much information is given regarding experiments in these various methods of eradication. Mr. Cotton also includes a comparison of the life-histories and habits of the North American fever tick and others.

New Vegetables.

Writing in the February *Fruit-Grower* (St. Joseph, Mo., U.S.A.), Mr. H. B. Fullerton, of the Long Island Railroad Experimental Station, records some new vegetables which have lately been introduced in America. After describing broad beans and sea kale, which are more or less known in Natal, he discusses two other vegetables—natives of Japan—known as “Udo” and “Sakurajima.” The Udo, a favourite in Japan, is a shrub that grows during the summer shoulder high. “It is another continuous performance plant like asparagus.” This plant grows all winter, and in January (in America) the delicate shoots can be cut off and, like celery, eaten raw; further, they furnish an exceedingly pleasing dish served very much as asparagus is handled with or without a white sauce. “It reminds one of the heart of celery. It has a flavour that is distinctly spicy and seems to please all palates.”

The Sakurajima is a giant summer radish. Planted in the summer it makes immense oval bulbs frequently weighing from fifteen to eighteen pounds. Eaten raw it is as delicate as the best spring radishes. Its flesh is very much like an apple. Sliced and cut in squares and cooked and served as turnips are, it makes a dish that is hard to beat. Its immense leaves grow to from two to three feet long. They can be cooked and make delicate greens. It will keep all winter if given half a chance. Many failures are made with it because it is planted before the hot weather comes. With this exception, it is, it is stated, an extremely easy plant to grow.

Selecting Laying Stock.

In the February issue of the *Agricultural Journal* of Victoria Mr. H. V. Hawkins, Poultry Expert, gives some very useful information on the selecting of birds for egg production. As every poultryman is doubtless aware, each hen has her own individuality, *i.e.*, certain hens lay eggs that are in nine cases out of ten hatchable. Some hens lay well, but, although their eggs are usually fertile, they will not hatch whether set under a hen or placed in the best incubator. The chicks develop to a certain size, in many cases being fully formed, but die in the shell. Again, many hens lay eggs that are seldom fertile.

In selecting birds the poultry-keeper has several objects, and, as Mr. Hawkins mentions, in order that the desired objects may be obtained, certain characteristics should be looked for. The hen should be low set, and stand on a pair of shanks fairly wide apart. The head should be nice and clean cut with a full, bright eye. In other words, hens should

show feminine character and not wrinkled and sunken features. A hen with a large capacity for food, *i.e.*, has a large crop, is usually a payable bird to feed. The smaller the sack of food she takes to roost at night the fewer eggs will she produce.

Paper-Making.

In Circular No. 41 of the United States Bureau of Chemistry, Mr. J. P. Veitch, Chief, Leather and Paper Laboratory, points out the suitability of various products, most of which are not now employed, for paper stock, and also suggests different methods of maintaining sufficient quantities of paper-making materials in the future. Practically all fibrous vegetable materials will make paper, the quality being governed by the percentage of fibre sufficiently resistant to stand the action of the chemicals necessary to reduce to a working condition the most resistant fibres, while the quality of the paper which these materials make is determined by the length, strength, and felting qualities of the fibres and the chemical nature of the cellulose which they contain; the longer and stronger the fibres and the purer the cellulose (the more closely it corresponds to normal cellulose), the better the paper, the longer it will last, the more wear it will stand, and the less it will discolour with time or use.

The cheapest known raw material for medium-grade paper which can be obtained in large quantities is wood. It is highly important to practice conservation methods in its use. Therefore, the large quantity of waste from the lumber industry should be utilised for paper-making wherever possible. It is probable that such "new" materials are the cheapest which are available. Flax fibre, when it cannot be put to more important uses, should be employed in paper-making. The growing demand for paper-making materials may be supplied by the more conservative use of those which long years of practical paper-making have demonstrated are well suited to the purpose. When thus used there are ample quantities to meet normal requirements for many years.

The Tiger-Hunting Dog.

In the February number of the *Cape Agricultural Journal*, some very useful hints are given by "A South African," about dogs, which are used for the purpose of hunting tigers. The best dog to be used for the purpose is a cross-breed between the mastiff and the bull-dog. In these dogs is found the combination of the swiftness and tenacity of the one with the strength of the other, which have always proved to be the best for fighting with a tiger. A tiger is tenacious, and is not easily killed,

but he cannot stand being continually worried, and it is this that soon tires him, and when he slackens his attack, the dogs then tackle him in the throat.

As regards the best means of training a dog for tiger-hunting, the writer states that the animal should begin early. When he is about six months he should be taught to catch young baboons, who do not offer much resistance, though plucky in defence at the start. When he comes to be about a year old, he should for the next six months be induced to catch large baboons. After the dog has been accustomed to fight the large baboons, he should, by the time he is two years old, be put on the scent of tigers. But he should at first be taught how to attack a tiger when in a trap. It is here that his most important lesson begins for tiger-hunting and killing. If a forefoot is in the trap, fix the trap so that the tiger cannot turn in a circle, catch hold of its tail, shake it, worry the animal, and induce the dog to bite and worry from behind. When all strength is apparently gone, then only should the dog be induced to bite in the neck. In most cases it requires only two or three lessons; the dog, as if by instinct, seems to know when and where to attack.

The writer also adds that the best bait for a tiger is the carcase of a baboon. The reason why being unknown, but perhaps the meat is sweeter and softer than that of other animals.

Planting Fruit Trees.

We have not yet received a copy of the recently issued Ninth Report of the Woburn Experimental Fruit Farm, but *Nature*, in its issue of the 25th February, gives an interesting resume of an article contained in the Report on the Planting of Fruit Trees.

It is an article of faith among fruit-growers that fruit trees must be planted in a certain special way if success is to be obtained. The soil is properly prepared, a large hole is made, wide, but not deep, the roots are carefully spread out in all directions and arranged near the surface, with a slight upward bearing at the ends. The soil is filled in with many precautions. Small quantities of the finer soil are first worked in among the roots, hollow places caused by archings in the stouter roots are filled up, and then the rest of the soil is put in, trodden carefully down, and the whole left to the compacting influence of the rain. The tree is supported by stakes until it is sufficiently firmly established.

All this, according to the report, is precisely wrong; it is all exactly the opposite of what it should be. The proper way to plant a tree is to make a small hole, to double the roots up anyhow and stick the tree in, throw in the soil, and ram it down as hard as if one were fixing a gate post. The experiments seem convincing enough. They have been made at Woburn, Harpenden, Bedford, various places in Cambridgeshire, and in Devonshire; 59 per cent. of the sets showed in favour of ramming, 27 per cent. showed no difference (i.e., all the elaborate detail of the ordinary way of planting was simply a waste of time), and only 14 per cent. were against ramming. It makes no difference by what criterion the trees are judged; planting in this new way gives better results than planting in the orthodox fashion.

Examination of the trees shows that ramming has led to a copious development of fibrous roots. Direct experiments showed that the fibrous and small roots produced in the nursery before lifting play no great part as roots during the subsequent life of the trees; the important point is to induce fresh root formation and ramming does this more rapidly than the orthodox method of planting. No harm was done, and sometimes even good resulted, when the old roots were deliberately damaged before planting.

Fruit-Drying.

The *Journal of Agriculture* of South Australia publishes in its November issue a further instalment of Mr. G. E. Mitchell's interesting report on fruit drying in California, in which some interesting particulars are given with regard to the drying of peaches and apricots. Apricots hold fourth position in the output of Californian dried fruits. Great attention is given to the industry, and only suitable varieties are dried. The favourite drying variety is stated to be the Moorpark, which dries with a fresh, bright colour. The Royal, which is the most extensively planted apricot in California, is a good drying variety. The St. Ambrose is also popular. A very attractive apricot of a large size and deep golden colour is the Routier's peach.

Apricots for drying are picked at the time when they are ripe, and can be cut in two with a knife, still retaining their shape. The fruit is picked carefully, without bruising, into baskets or cases, and the sample must be as equal as possible; otherwise grading is necessary. As soon as possible after picking the fruit is taken to a cutting shed, carefully cut in half (not pulled apart), the stones removed. The halves of the apricots are then spread evenly on trays, with the cut

side up, and removed as soon as possible to the fumigator. If it be not convenient to burn the sulphur at once, the door is kept closed until ready. If delay occurs in sulphuring, bruises on the fruit show out and it is apt to get dark in colour. Enough sulphur is put in the room to fill it with fumes. One pound of sulphur gives off sufficient fumes for about 300 cubic feet of space. According to different experts, the time to leave apricots in the sulphur house varies from half an hour to twelve hours—a very wide margin between. The common custom is to leave them in the sulphur until the cup or depression, where the stone was removed from, is full of juice. In evaporating, the fruit is placed in the coolest part of the evaporator, starting the temperature at, say, 140 degrees and gradually raising to 170 degrees. Apricots take about sixteen hours to dry in the evaporator. If placed in the sun during hot weather they take three or four days. Girls are employed to pick over the fruit two or three days after it is placed out, or when required, and remove dried fruit, while the undried is left on longer. When dried the fruit is put into sweat boxes and stored in a cool, dry place until ready for re-processing.

Peaches are dried in a similar manner to apricots, about the only difference being that it will not stand so much sulphur. One hour in the sulphur-room is the usual time. Freestone peaches are almost invariably used, but some varieties of clings are also favoured. The latter are fitted with a spoon-shaped knife specially constructed for the purpose. Peaches are generally peeled before drying. Some varieties peel readily, but other ones are done with knives, or they may be first sulphured. The sulphur loosens the skin, which then comes off readily. The fruit, however, is re-sulphured after peeling, otherwise it would darken in colour and become spotted. Like all other fruits, peaches are dried in the sun when possible. The chief drying varieties are:—Foster, Late Crawford, Lovell, Morris, White, Muir (which makes a dried article of exceptional sweetness), and Wheatland.

A little bran occasionally will be good for the work horses.

Keep the calf growing at all times from the moment of its birth. It requires just twice as much feed to raise the stunted calf as the one that is kept growing.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

THE Annual Conference of the Natal Agricultural Union was held on the 21st, 22nd and 23rd of April. A report of the proceedings will be found elsewhere in this issue.

DRONK VLEI.

The Dronk Vlei Farmers' Association held their annual general meeting at Creighton on the 13th March, with the President (Capt. A. W. B. Perceval) in the chair.

The following address was delivered by the president:—

"Gentlemen,—I have much pleasure in reporting as follows on the work of your Association during the eighth year of its existence. The first and most noticeable feature is, I think, the rapid and solid progress made by the district generally. All the farms, with two exceptions, are now beneficially occupied, and if increased cultivation and fencing, better houses, more stock, and greater comfort are evidence of well-being, then our district may well congratulate itself. Last season 13,226 muids of mealies were trucked at Creighton Station, and a further considerable number were, of course, consumed locally. This summer again still more land has been broken up and, given favourable weather, I think we may reasonably anticipate a considerably larger output. Of this much will no doubt be exported, thus bringing into the Colony fresh and much-needed capital.

"More advanced methods of farming are gradually coming into practice, and though much might still be done in this direction, especially by adopting a system of rotation of crops, and by growing winter food for stock, yet better implements and a more generous system of manuring are everywhere in evidence. Co-operative principles have been adopted to a limited extent, notably in the purchase of grain bags, but I think an extension of those principles to the purchase of manures and the marketing of crops would prove advantageous to farmers, who could thus eliminate the middleman, and secure for themselves the full reward for their capital, skill and energy. The lines on which this can be done were explained by Mr. C. Hitchins on a recent visit to us, and are, I think, generally understood.

"Some few of you now send cream to the dairy, and when we consider what dimensions this industry has reached, not only in temperate New Zealand, but in parts of Australia where the climate is similar to our own, and the very small area of many of the holdings there, I think you will agree with me that much more might be done in this direction.

As an adjunct to this industry, now that an up-to-date bacon factory can be reached by rail and ensures a market for all we can send, the rearing and fattening of pigs on skim milk and crops grown for them should prove profitable. Wattles are now grown to a limited extent, chiefly as break-winds; nothing has been done in the way of planting trees for sheltering stock from the sun, and the establishment of even small plantations on suitable sites, for furnishing firewood, etc., would certainly seem advisable. Your Association does not confine its energies to matters of farming pure and simple; it takes a broader view of its duties and responsibilities, and has always been ready to act as a public body in all questions affecting the community. I would therefore impress upon any of our people who are not yet members that it is their duty to themselves and their neighbours to join us; the subscription is small, and the benefits to be obtained from united action and consensus of opinion are immense.

"Gentlemen, great changes, fraught with good or ill, are impending over this Colony; let us all, collectively and individually, study the proposals that have been made to secure Closer Union with the other South African Colonies bearing in mind that the decision of this momentous question will affect not only ourselves but our children's children. I make no excuse for introducing this matter into my remarks to-day; what can more closely concern us as farmers, as Colonists, as members of a great Empire, than the question of the laws and conditions under which we live?

"Be not like dumb cattle,
'Be a hero in the strife.'

"What farmer worthy of the name toils all day in his field and never raises his eyes to see what weather he may expect?

"During last year, that is since the annual meeting held on March 14th, 1908, three meetings have been held, and in addition two public meetings for discussion of East Coast Fever matters took place on July 1st and September 19th respectively.

"Your delegates, Mr. Marriott and myself, attended the annual Conference of the Agricultural Union held in Maritzburg on April 14th, 15th and 16th, and easily secured the adoption, by a large majority, of the two resolutions put forward by your Association. These dealt respectively with the Land Bank, and advance of fencing material. It is a matter of regret that the benefits supposed to be conferred by the establishment of that Bank should be apparently out of reach of the small farmer.

"Lack of Government funds having necessitated the withdrawal of road parties, our roads have been left to look after themselves. If the usual heavy wagon traffic had been going on, the Creighton-Riverside route would be impassable by now. As a result of urgent representation made in the name of your Association, a party has been sent to attend to a dangerous place on the Creighton-Ixopo road. The Chief Engineer.

P.W.D., is, however, fully in sympathy with the needs of the district, and is prepared to entrust to your Executive repairs not calling for any large expenditure.

"The extension of the N.G.R. to Riverside is now open for traffic of all kinds except live stock. At Mondri Halt—the only intermediate place where heavy goods such as mealies might be picked up—there is no siding for loading trucks. As this station would be used by six farms, Mondri Store, and possibly the Trappists at Centacow, it seems short-sighted policy on the part of the railway to refuse a siding.

"Although a trucking pen for cattle has been provided some months ago, and has, I believe, been used twice, we have been unable, in spite of considerable correspondence, and several interviews with officials, to procure a loading bank or any convenience for trucking mealies on the east side of the line. With the removal of two goods sheds and the transference of the efficient and obliging checker to Riverside, I fear some of you will find great inconvenience and delay in trucking your crop this coming season. Each bag will apparently have to be carried from the wagon across the track to the truck—no one to take delivery, put on tarpaulin, or see to the safety of the goods while the truck is being filled. I think this is a matter calling for urgent attention.

"Although the imperative necessity for a bridge has been urged upon Government by your Association for the last five years, and money has been voted by Parliament for the purpose, nothing further has yet been done. From recent correspondence with one of our Parliamentary representatives, I gather that the work will probably be commenced after the present rainy season. Possibly funds will then be available from taxation.

"Finger posts, rendered necessary by the deviation of the Creighton-Ixopo road, were provided by the P.W.D., and their erection arranged for by your Executive. Our thanks are due to those gentlemen who gratuitously undertook this work.

"The storm that passed over part of the district in January fortunately occurred too early to do much damage to mealies, though it proved destructive to gardens and orchards. Since then we have had almost continuous light rains which, while promoting the growth of the stalk and foliage, have not been conducive to the formation of the grain. A period of warm weather seems now desirable for this purpose; given that and the absence of early frosts, we may reasonably expect an excellent harvest. Stock generally are healthy; I have not heard of a single case of horsesickness; blue tongue has been prevalent and has done some damage among the flocks, but those who were wise enough to inoculate in time have escaped serious loss.

"East Coast Fever, though prevalent in some parts of the Colony, has not made its appearance in this Division, and if every farmer is on

the alert and loyally carries out the regulations, we shall, I hope, continue to keep it out. In this connection the ward system is undoubtedly of great service, and, though many of us would prefer that system to be carried out in its entirety by giving a committee in each ward the control of the cattle therein, yet we cannot but be grateful to our Advisory Board for their good work and for the expense they have been at of time, money and patience in keeping the pest out of this division.-- (Since writing the above we were yesterday informed that the disease had broken out in Springvale, and that in consequence all movement of cattle had been stopped in this Division. It is not at present clear why movement should be stopped in this ward, when there are two others between us and the infected one. In the meantime we should feel it our duty to loyally support the Board, who no doubt have information not possessed by us.)

"In laying down my office on the conclusion of the term for which I was elected, I wish the Association and each of you individually a very prosperous year, and I hope that under whatever political conditions the Colony may be in twelve months' time, Dronk Vlei may still be thriving, and that we may then have a school, a hall, and a bridge."

LOWER TUGELA.

The sixteenth annual meeting of the Lower Tugela Division Association was held at Stanger on the 16th April, Mr. W. R. Hindson presiding. The other members present were: Hon. W. F. Clayton, M.L.A., Messrs. F. Addison, A. S. L. Hulett, G. Stewart, D. Brown, E. W. F. Mulett, W. H. Woolnage, T. G. Colenbrander, H. R. Balcomb, W. M. Dickson, H. Watt, and H. C. Smith (Hon. Secretary).

The Secretary read a letter from the Under Secretary for Agriculture that the Director of Agriculture and Forestry would be happy to visit the Stanger Experimental Farm periodically with the object of interesting himself in future experiments, and that the publication of all results obtained to date was being effected in a compilation of memoirs, upon which Mr. Sauer was engaged.

PRESIDENT'S REPORT.

The Chairman read the following annual report:—

"In presenting to you the annual report of the Association, I am glad to be able to say that, while we have not yet risen above the depression alluded to by the late President when vacating office, there is now, I think, an element of hopefulness in the community, which, I am sure, will grow until it is powerful enough to lift us out of the rut which we have, unfortunately, been stuck in for so long a time.

"Owing to the state of transition in the political life of our own and adjacent Colonies, we have been living in an atmosphere of sus-

pense, which has added to, rather than relieved, the depression alluded to. But the year will stand out as one of the most, if not the most, important epoch in the history of South Africa, by reason of the combined efforts made by the representatives of the various Colonies to bring about that political union which has come to be absolutely essential to the progress of this sub-continent. A Draft Constitution Act has been evolved, which, though susceptible of amendment in some respects, will, it is hoped, be the foundation upon which a new, prosperous and powerful nation will be built.

"While the wit and wisdom of man have been exercised to bring about a more satisfactory state of things in the realm of politics Nature has been steadily pursuing her beneficent course with a generosity that has filled our hearts with thankfulness. The weather conditions throughout the year have been most favourable for the products of the soil. One of our oldest and most highly respected planters tells me that this has been the best season he has known for forty years. While I cannot look back over such a space of time, the experience of a quarter of a century enables me to make an equally satisfactory statement.

SUGAR.

Our staple product—sugar—has benefited to the full, and the output from the various estates will be a record one. Unfortunately, the milling capacity of the local sugar factories is not equal to deal with the crop in due season, and planters this year are sending their cane to the factories earlier than usual. An appreciable loss is caused by this premature crushing, but it is better to lose slightly at the beginning of the season than to crush late, which means not only loss in sugar, but loss of growing time for the ratoons of the cane that has been cut. I may here mention that last season the loss to planters in the Division, through having to crush out of season, is estimated at fully £10,000.

"When dealing with the sugar crop it is most interesting to take note of the almost phenomenal success that has attended the efforts of the courageous and energetic planters across the Tugela. In some places in Zululand the yield of cane to the acre has averaged 75 tons, and when it is known that this cane realises 10s. 3d. per ton of 2,000 lbs. at the mill it will be seen what a handsome thing these Zululand sugar planters have in hand.

"The mill at Amatikulu, which did not commence operations until late in the season, turned out 3,250 tons of sugar last year, and this year it is estimated that the same factory will make 7,000 tons.

"Planters, both in this Division and in Zululand, complain of the inconvenience and loss caused by the Natal Government Railways by reason of some of the conditions imposed with reference to leases and the construction of sidings. Surely every encouragement and assistance should be given by the Railway Department to sugar planters, in Zulu-

land especially, as the very existence of the railway depends upon the prosperity of these planters.

"The question of adequate manufacturing capacity for present and future requirements is one that is very seriously exercising the minds of present and prospective planters. As has been shown, the present equipment is not sufficient to deal with the acreage of cane now planted—that is, to deal with the cane just at the right time. When the steam plough was in the district several large areas of land were turned over with a view to further extension of cane fields, but owing to the insufficiency of milling power these areas have been planted out with mealies.

"Of course, the question of erecting additional factories is purely one of capital, and with the union of the Colonies established there would, I am sure, be abundance of money forthcoming for sound payable propositions in this line.

TEA.

"I now come to the next most important product of the Division, viz., tea. This crop has also been favoured by the weather conditions which have prevailed throughout the year. Perhaps many of you will be surprised to learn that on many of the tea estates the rainfall has been less this year than it was last year, but in comparison with last year the rainfall has been much more effective. There has been an absence of those heavy downpours which are so destructive to our highly tilled hillsides, and which in other directions cause such inconvenience and loss. And while the distribution of the rainfall has been more equable the temperature has also been more even and freer from those extreme variations which throw back the flushes and puzzle the Field Manager to such an extent. Tea, of all plants, stands sudden change of temperature the worst.

"The out-turn of tea in the Division this year should considerably exceed that of last year, and should be slightly more than three million pounds. The export of Natal tea has been on a much smaller scale than it was last year, and consequently this, with the increase in yield, gives us a much heavier stock in hand than we had a year ago, but the quality of Natal tea is now much better than it was, and I am glad to say that much more discrimination in selecting their teas is now being exercised by the consuming public.

THE MEALIE CROP.

"Taking it over the whole of the district, the mealie crop is a very good one, but as the acreage planted this year is less than formerly the crop will be very little more than the district is capable of consuming. The decrease in the area under mealies is accounted for by the fact of land which in previous years was leased to Indians having now reverted to the owners and been put under sugar cane. The number of Indian mealie growers has consequently decreased.

EAST COAST FEVER.

"This pestilence, which has caused this district such serious loss and which still hangs as a dark cloud over other parts of Natal, has ceased to exist in this Division. We would fain believe that our troubles in this respect are over, but when we look round and see the district denuded of cattle we feel that we certainly have had to pay heavily for the immunity that now exists. 'It is easy to be wise after the event,' but looking back now it does seem to some of us, at all events, that the right course to have adopted at the outset would have been to have stopped all movement of cattle and to have resorted to the stamping out process wherever the disease appeared. Serious indeed would have been the inconvenience and loss that would have been brought about by the adoption of these stringent measures, but would they have entailed anything like the loss the Colony has had to bear, and what it may yet have to bear, before we are rid of this 'dread visitant?' It seems to me that stoppage of all movement of cattle and stamping out is now the only way to arrest further spread of the fever. We, in this Division, are now hoping that our veld is clean and that next spring experiments may be made in the way of re-stocking. But this should be gone about with the greatest care, and probably it would be wise to make dipping or spraying compulsory on all re-stocked farms. The district is now clean; let us keep it so. At all events let us do all we can to keep it so. When free from ticks there is no reason why this should not be one of the best dairying parts in Natal, as with its perpetual spring the country yields green food all the year round.

STANGER EXPERIMENTAL FARM.

"Now I would like to say a word about the Experimental Farm. You will remember that this subject came up for discussion at our last meeting on February 26th, when the Secretary read a report on the work and present position of the Farm, and when it was decided to ask the Committee to carry on the work of the Farm for a further period. Owing to the withdrawal of the Government grant, no fresh experiments have taken place for some time. Experiments already commenced are still attended to and accurate data kept, which data is at the disposal of anyone who wishes for information. The revenue crops are well looked after, and these just clear working expenses.

Mr. Webb, the manager, has done well, in that, while he has restricted expenditure, he has kept the Farm in its present satisfactory condition. The Farm is in the remarkable position of having a considerable balance at the bank—a phenomenal state of things in these hard times—and when, in addition to this, we are told that the crops at present on the soil will yield fully another £400, we are sure that the management is entitled to our hearty congratulations.

INDIAN LABOUR.

"My report would be very incomplete without some reference to the Indians. Early in the present year we were threatened with the stoppage of indentured labour from India. On the 16th May we had a meeting of the Association to discuss the threatened action of the Government. No doubt you will remember Mr. Clayton made a very effective speech on the occasion, and a debate ensued, in which it was very clearly set forth what would be the disastrous result to Natal were coolie labour interfered with. Subsequently a memorial to Government was drawn up, which was signed on behalf of your Association, and others, and presented to the Legislature. This memorial, I am told, had a very good effect on members of both Houses, giving, as it did, information of which, up till then, most of the members were entirely ignorant, and bringing home to their minds what would be the effect of the course it was proposed to pursue. A Bill having for its object the stoppage of importation of Indians was introduced into the Assembly, but this Bill, after a very short Parliamentary career, was withdrawn, and a Commission was appointed to take evidence on the whole question of Indian *versus* Native labour. This Commission sat in Stanger on the 17th and 19th March, when your delegates, Messrs. Foss, Colenbrander, Morrison, and your President, gave evidence on behalf of the Association. The sitting of the Commission were held in camera, consequently the public does not know the nature of the evidence led, but there can be no doubt it was proved over and over again that the Indian labourer is absolutely essential, not only to the economic welfare of Natal, but essential to the very existence of the European population in the coast district of the Colony. Let anyone take the journey from Durban to Stanger at present, and he will find on every hand, everywhere along the route, nature resplendent in her glowing testimony to the worth of the Indian labourer.

"The Indian is ready to come to us, pleased to remain with us, and though at times difficult to do with, he has been the one potent factor that has enabled us to take full advantage of the splendid season which is just now drawing to a close.

"And the Native, what of him? Government did not forget the Native either when formulating Bills at the commencement of last season, and three Bills dealing with Native affairs were brought forward. One of these Bills, dealing with the amount of interest chargeable to Natives on loans or debts, was passed and became law. The two other Bills were passed through the Legislature, but have not yet been promulgated. These Bills, I may remind you, were discussed at a meeting of the Association held on the 10th July last. I am sorry to say that this meeting was not so largely attended as one would have liked to have seen considering the importance of the subject brought forward, and the fact that this Division has one of the largest Native locations in Natal.

"It is curious to notice that even in the household economy of the Native, the Indian plays a very useful part. The Native, as time goes on, seems to rely more and more on his wage-earning ability to supply his daily needs, and, with money earned in working for others, purchases some of his food supplies from the Indian farmer. In this way we find that the supply of Native labour is increased—that is for such work as they care to engage in. Boys and girls are also now offering themselves for jobs about the factories, such as loading trucks, etc., but strangely they decidedly object to work with the hoe.

GENERAL.

But, gentlemen, I have, I am afraid, already wearied you, but before closing there are just one or two local matters to which I would like to make slight reference.

"Our friends near Tinley Manor, and in that neighbourhood, have organised an association similar to our own, which they call "The Chaka's Kraal and Umhlali Farmers' Association." We congratulate these friends, and wish their Association every success, and I would propose that our secretary write The Chaka's Kraal and Umhlali Farmers' Association sending our greetings and good wishes.

"Then I wish to express my high appreciation of the unvarying kindness and courtesy I have received at the hands of Mr. H. C. Smith, our indefatigable secretary. Living at some considerable distance away from Stanger, and in a somewhat out of the way place, it is impossible for me to keep in touch with what goes on in the district, and I have to thank Mr. Smith for information on local matters kindly supplied when asked for.

"The Association is also very deeply indebted to Mr. Smith for the valuable services he has given to it during the year.

"The balance sheet of the Association is before you, showing a balance of cash in hand of £12 15s."

The report having been adopted, the following officers were re-elected:—President, Mr. W. R. Hindson; vice-president, Mr. A. E. Foss; hon. secretary and treasurer, Mr. H. C. Smith; committee, Messrs. F. Addison, T. G. Colenbrander, A. S. L. Hulett and G. Stewart.

On the motion of Mr. A. S. L. Hulett, and seconded by Mr. F. Addison, the following resolution was unanimously passed:—

"That this meeting emphatically protests against the terms of the Transvaal-Mozambique Treaty and regards the same as inimical and dangerous to the industries of Natal, and would urge upon the Government the necessity of an understanding with the other Colonies of South Africa

whereby no foreign State shall be favoured as against British Colonial interests."

A vote of condolence with the widow of the late Mr. H. M. Frerexsen was passed. Mr. Frerexsen was a member of the Association for many years.

The Position of East Coast Fever.

LIST OF OUTBREAKS DURING MARCH AND APRIL.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st March to 20th April:—

Dundee District.—Outbreak on farm "Monteith" (north of Dundee-Vryheid line and east of main line).

Umvoti District.—Outbreaks on farm "Elladale" and Greytown Town Lands.

Krantzkop District.—Outbreaks on farms "Dingley Dell" and "Paul's Rest."

Umgeni District.—Outbreaks on farms "Bush View," sub-division of "Ockert's Kraal," Lot 7 and part of Lot 13, "Garden Cliffe," "Waterfall," "Slangspruit" (for East Coast Fever purposes this farm is considered in the Camperdown Division), "Bell View," sub-division of "Saxony," "Sterling Hill," sub-division of "Plessis Laager," "Saxony" and "Cluny Lodge."

Pietermaritzburg City.—Outbreaks among cattle of Mrs. Whittle Herbert, Mountain Rise, Mr. H. Mason, and "Sikota," New Scotland.

Lion's River District.—Outbreaks among cattle of Mr. T. W. Dicks, Howick Village, Mrs. Shepstone, Howick Village, and on farms "Brae Side," sub-division of "Stocklands," "Midmar," sub-division of "Allen's Nek" (west of main line), and "Magtenberg."

New Hanover.—Outbreaks on farms "Kruisfontein," "Braxholme," "Honey Grove," Albert Falls Commonage.

Seven Oaks.—Outbreak on farm "Weltevreden."

Estcourt.—Outbreak on farm "Springfontein," Lot R (west of main line). There is no doubt the disease has existed on this farm for some months and was looked upon as "Gallsickness," and not reported to the Veterinary Department. Positive evidence has not yet been obtained that the adjoining farms are infected, but they must be looked upon with suspicion, and Mr. Power thinks the existence of the disease on some of them will very soon be proved.

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of Victoria County and Mapumulo, Umsinga, Vryheid, Ngotshe, Babanango, Paulpietersburg.

Meteorological Returns.

Meteorological Observations taken at Govt. Stations for Month of March, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'strain-fall in 1 day.		Total for Year from July 1st, 1903.	Total for sameper'd from July 1st, 1907.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	80.1	66.2	85	59.8	2.80	13	.63	5th	31.30	29.25
Stanger ..	82.1	64.7	92	56	3.10	16	2.08	30th	33.52	38.87
Verulam ..	84.9	64.6	94	56	2.06	10	.80	1st	29.65	31.99
Greytown ..	79.7	51.1	89	45	3.62	11	.82	8th	38.07	36.03
Newcastle ..	82.6	56.1	92	45	3.78	8	1.07	2nd	—	36.28
Imbizana ..	81.1	62.0	93	55	2.34	14	.70	3 & 26	34.15	36.77
Estcourt ..	79.1	55.0	89	48	1.09	8	1.24	23rd	28.55	27.07
Bulwer ..	—	—	—	—	5.45	19	1.80	21st	51.25	42.14
Ixopo ..	—	—	—	—	2.65	12	1.10	7th	30.20	—
Mid-Illovo ..	77.6	58.2	91	52	2.89	14	1.38	8th	35.55	33.22
Port Shepstone ..	85.8	62.1	95	55	3.76	7	1.40	th	34.68	35.12
Umzinto ..	84.6	55.7	92	54	3.15	6	1.15	7th	36.57	34.25
Richmond ..	76.5	55.9	90	43	4.58	15	1.37	20th	46.06	35.39
Maritzburg ..	79.8	57.5	93	50	3.68	18	.59	21st	31.87	31.80
Howick ..	77.8	54.9	88	49	4.14	.5	1.32	30th	35.63	34.40
Ladysmith ..	84.4	57.0	94	52	2.08	11	1.52	22nd	—	—
Dundee ..	79.7	58.6	89	49	1.81	4	.79	22nd	37.69	28.35
Krantzkloof ..	77.2	61.1	94	55	1.96	13	.76	rd	33.57	—
New Hanover ..	82.5	57.2	95	52	3.00	18	1.55	30th	36.26	35.79
Krantzkop ..	81.4	69.7	88	60	2.38	10	.58	21st	29.47	—
Lidgerton ..	78.7	48.5	90	41	3.47	18	.39	21st	37.19	—
Charlestown ..	75.0	50.6	82	44	2.72	10	1.09	3rd	42.76	27.82
Utrecht ..	81.4	—	99	—	2.40	10	.80	22nd	—	—
Vryheid ..	82.5	57.2	—	50	2.12	8	1.07	9th	—	34.74
Mtunzini ..	84.0	63.1	94	50	4.68	10	.93	25th	54.05	42.44
Melunth ..	79.1	59.8	96	55	.82	12	.21	21st	26.56	24.13
Umbombo ..	80.6	61.1	90	56	3.13	9	2.00	th	40.55	30.90
Point ..	—	—	—	—	3.87	14	.75	30th	36.24	39.35
Nqutu ..	75.7	53.0	83	43	2.22	4	1.09	21st	35.05	—

Meteorological Observations taken at Private Stations for Month of March, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain- fall in 1 day.		Total for Year from 1st July, 1908.	Total for same period from 1st July, 1907.	
					Fall.	Day.			
Adamshurst	92	50	5.17	12	2.53	30th	—	—	
Hilton	85	46	4.22	19	1.14	30th	37.80	33.41	
P.M.B., Botanical Gardens	—	—	4.36	14	1.15	21st	33.42	—	
Ottawa	—	—	2.04	9	0.7	3rd	29.94	32.87	
Mount Edgecombe	—	—	—	—	—	—	—	—	
Cornubia	—	—	—	—	—	—	—	—	
Milkwood Kraal	—	—	—	—	—	—	—	—	
Blackburn	—	—	—	—	—	—	—	—	
Saccharine	—	—	—	—	—	—	—	—	
Umhlangeni	—	—	—	—	—	—	—	—	
Equeefa	90	60	1.88	8	0.68	6th	—	—	
Umzinto, Benewa	—	—	2.78	12	1.04	8th	34.47	38.23	
Harden Heights	—	—	2.96	7	1.27	19th	34.8	38.39	
Reit Vei	—	—	3.76	11	1.39	30th	—	—	
Bransholme	—	—	3.13	11	1.13	22nd	28.69	24.78	
Cedara—Hill Station	88	55	5.08	16	1.00	22nd	55.92	59.93	
„ Vlei Station	88	52	5.06	18	1.58	30th	29.18	—	
Winkel Spruit	88	48	5.15	18	1.66	30th	27.27	28.82	
Weenen	87	58	4.61	10	1.65	7th	34.99	34.75	
Giant's Castle	90	42.5	2.80	10	0.89	21st	—	—	
	71.8	40.2	5.51	14	1.21	20th	44.94	26.97	

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of March, 1909:—

COLLIERY	Average Labour Employed.					Output.	
	Productive Work.			Unproductive Work.*	Total.		
	Above Ground	Below Ground.	Total.			Tons. Cwt.	
Natal Navigation ..	394	686	1,080	10	1,090	24,457	0
Elandslaagte ..	319	708	1,027	9	1,036	17,878	7
Glencoe (Natal) ..	206	469	675	41	716	15,203	17
St. George's ..	247	456	703	—	703	14,025	0
Durban Navigation ..	201	416	617	—	617	13,822	0
South African ..	126	316	442	48	490	13,014	2
Dundee Coal Co. ..	300	458	758	—	758	12,102	4
Talana... ..	155	405	560	30	590	8,092	6
Natal Cambrian ..	196	272	468	32	500	7,765	11
Newcastle ..	86	395	481	—	481	5,254	3
Natal Steam Coal Co. ..	93	208	301	14	315	4,864	17
Hloboane ..	95	219	314	36	350	3,739	5
Ramsay ..	108	235	343	—	343	3,635	4
Hatting Spruit ..	93	138	231	6	237	3,007	4
West Lennoxton ..	71	118	189	—	189	2,476	6
Central ..	31	76	107	—	107	1,290	16
Ballengeich ..	—	—	—	95	95	688	11
Zululand ..	26	24	50	—	50	479	0
Vaalbank ..	—	8	8	8	16	8	16
Nooitgedacht ..	2	3	5	—	5	4	0
Dumbi Mountain ..	2	—	2	—	2	3	0
Totals ..	2,751	5,640	8,391	329	8,720	151,811	0
Corresponding month, '08	2,432	5,791	8,223	302	8,525	149,664	13

	Productive Work.			Unproductive Work.	Total, Mar., 1909.	Total, Mar., 1908.
	Above Ground.	Below Ground.	Total.			
Europeans	202	149	351	45	396	418
Natives	1,011	3,664	4,665	222	4,887	4,609
Indians	1,548	1,827	3,375	62	3,437	3,498

* Cost Charged to Capital Account.

‡ Includes February Returns.

Mines Department, Maritzburg, 7th April, 1909.

CHAS. J. GRAY,
Commissioner of Mines.**RETURN OF COAL BUNKERED AND EXPORTED.**

Return of Coal bunkered and exported from the Port of Durban for the month of February, 1909:—

	Tons.	Cwt.
Bunker Coal	69,800	18
Coa Exported	26,170	14
Total	95,971	12

Customs House, Port Natal, 1st April, 1909.

GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lung sickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	T. Kirkness ..	Coalfontein
			P. Nicholson ..	Boundary Slopes
A. B. Koe ..	Portion of Estcourt	"	J. A. Good ..	Jatiwana Hoek
		Lung sickness	A. W. J. Hattingh ..	Koplaagte
		Scab	R. Mattison ..	Calcrete
		"	H. Oelle mann ..	Berg Vleit
A. C. Williams ..	Utrecht ..	"	J. K. van der Merwe ..	Exce'sior
		"	A. W. J. W. tling ..	Blaauw Kraantz
		"	H. A. Potgieter ..	chuins Hoek
		"	C. Webb ..	Waterval
		"	M. van Rooyen ..	"
		"	J. P. Both ..	Spitsk p
		"	J. Z. Moolman ..	Green Vlei
		"	C. Emmett ..	Politick
		"	H. Potgieter ..	Onverwacht
		"	P. Labuschagne ..	Witfl. los
		"	N. Fourie ..	Langewacht
H. Van Rooyen ..	Babanango ..	"	G. T. van Rooyen ..	Groot Vlei
		"	C. Van Rooyen ..	Paardepoort
		"	G. Van Rooyen ..	Mel. boom
		"	Andrias ..	"
		"	L. Labuschagne ..	Friskevacht
		"	Hengwene ..	Paardeplaat
		"	J. Doyer ..	Hart's Kamp
		"	Sege ..	Nonpariel
		"	Nqulube ..	Paarde Graf
		"	M. Delport ..	Babanango
		"	Nkonkone ..	Paarde Graf
		"	Nggwene ..	"
L. Trenor ...	Alfred ..	Lung sickness	Sulwana ..	Location
		Scab	Yalwayo ..	"
		Lung sickness	Dumas ..	Location
		"	Uyimbil ..	Location
		"	Mlotshwa ..	Msingopansis Kraa
		"	M. Clothier ..	Slexcel
		"	E. M. Etheridge ..	Selhurst
		"	John Ryan ..	Norburg
		"	J. J. Oosthuis ..	The Gorge
		"	J. H. Payn ..	Burnside
		"	Byela's Kraal ..	T. Fynn's Location
		"	R. Fann ..	Blackwater
		"	F. Mzizi ..	Lot 1, Enquabeni
		"	E. Mzizi ..	Lot " F," Enquabeni
		"	J. T. Clothier ..	Whitecliff
		"	J. J. Oosthuis ..	H. ding Town Lands
		"	Swenyas ..	Blackwater
		"	G. Lorkan ..	Antioch
		"	Injongaved ..	Rydal Mount
		"	Mdingwas ..	Lot 3
		"	G. Knox ..	Knoxwood
		"	Sigunu ..	Lot F.
		"	Ndhlanunkunzie's Kr'l ..	Location
		"	Noganes ..	Ha ding Gate
		"	Mncanca's Kraal ..	Mount Pleasant
		"	Bodhlaginis ..	No. 1 Location
		"	Mqumnsla ..	Omega
		"	Spingaan ..	Hawar'en
		"	P. Ulbrecht ..	Ihuku
		"	Jabula and Sonjela ..	Mount Pleasant
Acting—J. Ralfe ..	Lion's River ..	Scab	C. J. King ..	Lynedoch
C. T. Vaughan ..	Paulpietersburg ..	"	C. Strapp ..	Oatlands
		"	P. Allen ..	Welverdiend
R. Wingfield Stratford	Newcastle ..	"	J. B. Rudolph ..	Bosch Krans
		"	J. H. McDuling ..	Rosedale
		"	C. Mavuga ..	Koppie Allen
		"	G. W. Thomas ..	Lang's Nek
		"	C. M. Koch ..	Christian
		"	G. Waal ..	"
C. E. Walker ..	Portion of Estcourt	Lung sickness	P. Ballantyne ..	Weston Town Lands
		"	J. A. V. Lindsay ..	Riverside
		"	F. H. Lindsay ..	Rosemount
		"	Natives ..	"

RETURN OF FARMS UNDER LICENCE (*Continued*).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
G. Daniell	Vryheid	Scab	J. Swarts	Vaalkrantz
			J. J. Odendall	Utkomst
			M. Kunzwana	Vredehof
			W. F. Hein	Goedg loof
			Mrs. Heynes	Brakpan
			A. de Lange	"
			J. Kruger	"
			E. Gunter	"
			P. Tredoux	"
			M. Gulu	Hardbet ald
			Mkelegana	"
			P. Swaats	Bloemendal
			C. Kritzinger	Vaalkrantz
			P. M. Bester	Leunnek
			A. Steenkamp	Driefwart
J. R. Cooper	Nkandhla & Nqutu		S. Mboyi	Mqumini
			S. Molife	Haladu
			L. Molife	"
			L. Msimango	Milane
			Charlie	Mas djeni
			C. M. Sekosana	"
			M. Ndhlovu	Dalaza
			N. C. Kruger	Nqutu
			L. & J. Mboyi	Magala
			U. Butelezi	Nqutu
			L. Mabuya	Magals
			M. Beta	Nqutu Foot
			M. Mbata	Telezi Hill
			F. J. Johnston	Lot 8, Nqudeni
			U. R. C. Hardman	Waustead
E. Varty	Western Umvoti ..		W. R. J. van Rooyen	Rustenburg
			D. C. S. Nel	Highfield
			L. J. van Rooyen	Driefontein
			H. Hansmeyer	Onrest
			Yena	Govt. farm, No. 149
K. Ripley	Emtonjaneni ..		F. W. White	Elizabeth
			Mangenga	Mfuli Mission Statn.
			Kehla	Crown Lands
			Mgvedhla	Morgenzon
			Mtwas	Doornpan
J. F. van Rensburg	Ngotshe		Umzehlala	Berv. gl
			H. Libertru	Torliyewonde
			Mfihlo	Wetevreden
			P. Swart	Rietfontein
			J. Potgieter	K. ndelaga
J. Stewart	Bergville	Lungsickness	A. C. Delport	Wonderfontein
			F. R. S. ockil	Itit Vlei
			Evans & S. ockil	Riet Vallei
			Menn	Kleinwaterfall
			Amos Nahlovu	Nazareth
E. W. Larkan	Umsinga	Scab	Oyugulangans	Umsinga
			Gogo	Somshoek
			E. C. Nuss	Groo. Vlei
			Tabatuba	Nazareth
			J. H. Nuss	"
R. Mayne	Eastern Umvoti and Krantz kop		J. A. Clement	Pomeroy
			J. Westhuysen	"
			L. J. Nel	Wilgund
			L. L. Nel	Maresdal
			J. A. Nel	Welgund
E. W. Bowles	Ixopo		J. Keyter	Elands kop
			J. T. Martens & nts	Broedershoek
			Maceingani	Loots Hoek
			Ngevana	Arundel
			Bogwan	"
			Genisani	"
			Magewana	Kiepat
			Nodwengw	"
			Ncopo	"
			Vuquza	"
			Putaza	"
			Nduba	Waverley
			Njunga	South Hills
			Makafana	Waverley
			Dumdum	Kolston
			Nqaye	Waverley

RETURN OF FARMS UNDER LICENCE (*Continued*).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
E. W. Bowles ..	Ixopo	Scab	Umenyama ..	Kolston
			Mancousika ..	"
			Unvakatshe ..	"
			Umbabila ..	Iprisugval
			Kebe ..	Location No. 6
			Luzi ..	Location
			Sabexa ..	Springvale
			Janga ..	Location No. 6
			G. Way ..	Herdstone
			Njoyetaba ..	Lot 29
			Thelwana ..	Lot 55
			Samtonbi ..	Ème ald
			Gungutshi ..	Location No. 3
			G. Thomson ..	Valahalla
			G. H. Cooper ..	Avetary
			D. E. Hardman ..	Ellington
			W. W. Watton ..	Rocky Halton
			Turana ..	Lot L.H.
			Mandemba ..	Lot D.U.
A. H. Ball	Weenen .. .	"	Tebenga ..	"
			E. F. Garland ..	Springvale
			E. W. Veley ..	Ay horpe
			L. Howes ..	Mornington
			J. P. Lotter ..	Berg Vleit
			P. H. Van Rooyen ..	Buffels Hoek
F. Kruger (acting) .	Giy, Umgeni . .	"	J. Peniston ..	Town Lands
			W. O. Harding ..	Melietuin
			W. M. J. Lotger ..	Waterfall
			L. C. Kinsman ..	Mount Moriah
			Umveli ..	Zwaartkop Location
			Dria ..	"
A. J. Marshall . . .	Dundee. . . .	"	Samuel ..	"
			Jantje ..	"
			Laduma ..	"
			L. Taylor ..	"
			A. C. Vermaak ..	Sigtunna
			T. C. Vermaak ..	Harrisdale
			J. W. de Brayn ..	Rooifontein
			B. J. Badenhorst ..	Kempenveldt
		"	L. Badenhorst ..	Kelvin
			H. A. J. Davel ..	Kliprug
			C. T. Vermaak ..	Kalderfontein
			H. P. Handley ..	Giba
			D. C. Uys ..	Parys

MANGE IN HORSES EXISTS AS UNDER

Owner.	Farm.	District.
Pinda, Vete & Sobuon ..	Strathsoon	Impendhle
Natives	Olivefontein	Umvoti
Natives	T worth	Lion's River

Future brood sows should have good constitutions. Remember this when making your selection.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 5TH MAY.

Gourton—Black sow. Impounded on 10th March by Mr. Van Wyk.

Ngutu—Dark chestnut mare, no brands, about 13·2, both hind fetlocks white, white mark behind knee near foreleg; chestnut gelding, no brands, about 13·3, all fetlocks white, piece out back ear off side; chestnut foal, no brands, both hind fetlocks white, piece out back ear off side. All unshod.

Vryheid—Three mare donkeys, one dark grey, no marks or brands; one light grey, nick centre right ear; one light grey, two nicks on top of right ear.

ON THE 12TH MAY.

Mooi River—Merino ram, six tooth, half moon on top off left ear, tip off right ear, medium sized horns, no brands. Probable value, £2. Impounded on the 27th March by J. Piccione, Greenfields, Mooi River.

Port Shepstone—Brown ram goat. Probable value, 6s. Impounded on the 22nd March, 1909, by Native Qaahu, duly authorised.

ON THE 19TH MAY.

Loteni—Brown bastard ewe lamb, black nose, ears and feet, top of right ear cut off, slit in remaining portion, very short horns, no brand visible.

Utrecht—White he goat, half grown, slit under left ear, slit top right ear.

POUND ESTABLISHED.

A Pound has been established, under the provisions of the Pound Act, 1898, at Mapumulo, and the Gaoler, Mapumulo, has been appointed the Keeper thereof, with effect from the date of assuming duty.

Notice.

Owing to abnormal pressure upon our space this month, as the result of the inclusion of a report of the proceedings of the Agricultural Conference, we have been obliged to omit the “quarterly” matter which was to have appeared in this issue—namely, scale of charges for vaccines, etc., at the Government Laboratory, list of East Coast Fever Advisory Committees, list of executives of Farmers’ Associations, and list of publications issued by the Department of Agriculture.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

	Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
			Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300 lbs. weight.	Over 300 lbs. weight.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1. Receiving per head	0 3	0 6	0 6	0 6	0 3	0 3
2. Killing and Cleaning	2 3	3 6	2 9	3 3	2 6	3 0
3. Labour	0 3	0 6	0 3	0 6	0 3	0 6
4. Disinfectants	0 1	0 1	0 1	0 1	0 1	0 1
5. Bagging (4 Quarters) ... per body	1 9	3 0	2 6	2 9	2 3	2 6
6. Cleaning of Tripes each	0 6	0 6	0 6	0 6	0 6	0 6
7. Chilling of Beef, up to 72 hours or portion thereof per body	1 0	2 9	2 0	2 6	1 9	2 6
8. Chilling of Offal, up to 72 hours or portion thereof per set	1 0	1 0	1 0	1 0	1 0	1 0
Chilling and Freezing Beef—						
9. 1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10. 2nd „ „ „ „ „	1 0	4 0	3 3	3 6	3 3	3 3
11. 3rd and remaining weeks or portions thereof „ „	0 8	3 0	3 0	3 0	3 0	3 0
Chilling and Freezing Offal—						
12. 1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13. 2nd „ „ „ „ „	1 0	1 3	1 0	1 0	1 0	1 0
14. 3rd and remaining weeks or portions thereof „ „	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars, apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

Agricultural and Other Shows, 1909.

DUNDEE (Dundee Agricultural Society).—Show, 10th and 11th June. J. McKenzie, Box 105, Dundee, *Secretary*.

GREYTOWN (Umvoti Agricultural Society).—Date not fixed. W. H. Gibbs, Box 24, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Date not fixed. E. V. Bambrick, Box 90, Ladysmith, *Secretary*.

NEW GERMANY (Durban County Farmers' Association).—No separate show contemplated; but it is intended to join the Durban and Coast Society for the purpose of making complete exhibit of Durban products.

PIETERMARITZBURG (Royal Agricultural Society).—Show, 17th, 18th and 19th June. Duff, Eadie & Co., *Secretaries*.

PIETERMARITZBURG (Natal Poultry Club).—Show, 17th & 18th June. A. J. Peters, Box 197, *Secretary*.

UMZINTO (Alexandra Agricultural and Horticultural Association).—Show, 8th July. George Lamb, Box 68, Umzinto, *Secretary*.

CAMPERDOWN (Camperdown Agricultural Society).—Show, 23rd July. Messrs. Walker & Burchell, Camperdown, *Secretaries*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—7th, 8th and 9th July. J. Morley, 399, Smith Street, Durban, *Secretary*.

DURBAN (Durban and Coast Poultry Club).—Show, 14th, 15th and 16th July. H. M. Fletcher, 26, Castle Arcade, Durban, *Secretary*.

HARDING (Alfred County Farmers' Association and Agricultural Society).—Show, 23rd June. H. C. Hitchins, "Hluku," Harding, *Secretary*.

NEW HANOVER (New Hanover Agricultural Association).—Show, 30th July. W. D. Stewart, New Hanover, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Byrne Farmers' Association; Eshowe District Farmers' Association; Richmond Road Farmers' Association; Donnybrook Farmers' Association; Ladysmith Farmers' Association; Hatting Spruit Farmers' Association; Boston Farmers' Association; Little Tugela Farmers' Association; Umvoti Farmers' Association; Highflats Farmers' Club; Vryheid Agricultural Society; Garden Castle Farmers' Association; Nottingham Road Farmers' Association; Seven Oaks Farmers' Association; Richmond Agricultural Society; Slangrivier Boere Vereeniging.

There is no best breed, the best sheep are those that receive the best care.

Farm Apprentices' Bureau.

LIST OF APPLICANTS.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

- | | | | |
|-----|-----|---------|---|
| No. | 1. | Age 16. | Has had 12 months' experience on a stock farm and 9 months' experience on an agricultural farm. Speaks Zulu and has a slight knowledge of Dutch. Is particularly anxious to get back on a farm. |
| " | 2. | Age 15. | Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch. |
| " | 3. | Age 24. | Colonial born Has a knowledge of bookkeeping. |
| " | 4. | Age 18. | Natal born. Anxious to learn. |
| " | 5. | Age 24. | Speaks Zulu. |
| " | 6. | Age 17. | Still at school. Speaks French fluently, and has a fair knowledge of German and Dutch. Is very well educated. Particularly anxious to learn farming. |
| " | 7. | Age 15. | Is keenly interested in farming. |
| " | 8. | | Applicant already placed with farmer. |
| " | 9. | Age 17. | Speaks Zulu and Dutch. Is particularly anxious to learn farming. |
| " | 10. | | (Applicant already placed with farmer.) |
| " | 11. | | (Applicant already placed with farmer.) |
| " | 12. | Age 17. | Natalian. |
| " | 13. | Age 20. | Is an orphan. Is anxious to learn farming. |
| " | 14. | Age 16. | Natal born. |
| " | 15. | Age 19. | Is desirous of learning farming. |
| " | 16. | Age 21. | Has had some experience on a mixed farm at Besters. Speaks Zulu. Is keenly interested in farming. |
| " | 17. | Age 20. | Speaks Zulu. Is keenly interested in farming. |
| " | 18. | Age 21. | Speaks Zulu. Is keenly interested in farming. |
| " | 19. | Age 17. | Speaks Dutch. Is keenly interested in farming. |
| " | 20. | Age 18. | Is an orphan. Is anxious to learn farming. |
| " | 21. | Age 21. | Speaks a little Dutch and Zulu. Is a good mechanic. |
| " | 22. | | (Applicant already placed with Farmer.) |
| " | 23. | Age 19. | Speaks Zulu and has a slight knowledge of Dutch. Has had two years' experience as a farrier and a wagon builder. Is keenly interested in farming. |
| " | 25. | Age 23. | Bricklayer by trade. |

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the fund, Colonial Offices, Pietermaritzburg.

All correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 113.—Age 27, desires to obtain a start on a farm in Natal. Came to South Africa six months ago; attended the preliminary classes at the Glasgow and West of Scotland Agricultural College, and has also obtained a certificate for Theoretical Agricultural Chemistry. Is steady, and would be willing to work without any salary in order to obtain a practical knowledge of farming.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 120.—Colonial born, 26 years of age, steady and an abstainer, carpenter by trade, and has had four years' experience of mixed farming in Natal, speaks Zulu and understands Dutch, desires to obtain employment on a farm (Northern District or the O.R. Colony preferred).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep for a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

TENDERS FOR MONO-RAIL SYSTEM.

Tenders are invited for the purchase of 6,400 feet of mono-rails, with points, etc., and four sugar cane trucks, from the Central Experiment Farm.

Tenders should be addressed to the Director, Cedara, and should be submitted with the least possible delay.

MAIZE SEED.

Growers who may have for sale selected seed of the following types of maize are invited to communicate as early as possible with the Director, Cedara :—Horse Tooth, Hickory King, Boone County, Golden King and Yellow Dent.

POULTRY.

Orders will be received for selected cockerels of the following breeds for immediate delivery :—Buff Orpingtons, White Minorcas, Silver Wyandottes and Plymouth Rocks,

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

DEVON BULLS.

Offers are invited for three young South Down bulls, by imported bull, "Star of the West." Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.

Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.

Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.

Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.

Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.

Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.

Agricultural Seeds, etc., for Irrigation Farming.—Curator, Government Station, Weenen.

Fruit.—Orchardist, Cedara.

Accounting Business.—Accounting Clerk, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry,
Cedara.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

SOUTH AFRICAN STUD BOOK.

A record of all classes of Stock; the object being to encourage the breeding of thoroughbred stock and to maintain the purity of breeds, thus enhancing their value to the individual owner, and to the country generally.

Application for Membership and Entries of Stock should be addressed:—

For CAPE COLONY ..	..	A. A. PERSSE, P.O. Box 703, Cape Town.
„ TRANSVAAL ..	..	F. T. NICHOLSON, P.O. Box 134, Pretoria.
„ ORANGE RIVER COLONY	E. J. MACMILLAN, Government Buildings, Bloemfontein.

THE SOUTH AFRICAN STUD BOOK

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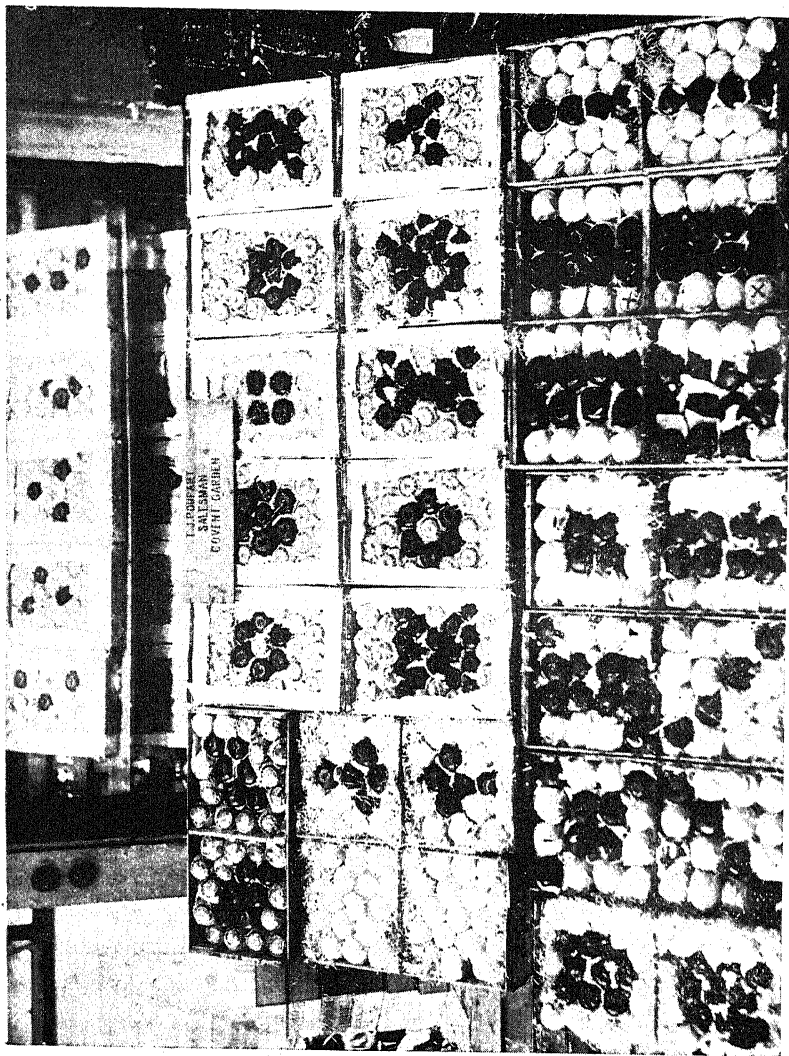
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A. A. PERSSE,

SECRETARY, SOUTH AFRICAN STUD BOOK ASSOCIATION.





NATAL FRUIT IN LONDON.—I.

Natal Citrus Fruit on Show at Mr. T. J. Poupart's, Covent Garden.

*The Natal Agricultural Journal.****The Improvement of Our Wool.***

IN this issue we publish an article on "Natal Wool on the English Market," which we earnestly recommend to the careful study of every sheep-farmer—indeed, of everyone interested in any way in wool. The article is the outcome of an inquiry among the leading wool-brokers and authorities on wool in the United Kingdom instituted by the Natal Commercial Agent in London (Mr. Francis Harrison). Mr. Harrison sent all the replies to his inquiries to the Minister of Agriculture, and we have incorporated the information contained therein in the article which we publish this month.

The opinions which Mr. Harrison has collected, so far as our wool itself is concerned, may be considered under two heads—the difference, from a market point of view, between Natal and Australian wool, and suggestions for the improvement of our wool. As regards the first of these two points, it will be seen that opinions vary. Some, as we have pointed out in the article itself, consider that our wool compares favourably with the Australian, while others consider that it is not as fine and is inferior as regards its spinning qualities. Again, while some, on the one hand, describe our wool as being of good length in staple, others state that it is of short staple as compared with the Australian article. We may reasonably conclude, from an examination of all the opinions expressed, that good Natal wool in itself is as good at least as average Australian, but that this better wool does not form as large a percentage of the total wool exported as it might do.

The first fact of importance, then, which presents itself is that we can produce wool as good as the average Australian; and the very fact

that we are producing even a relatively small quantity, such as we are at present, is an indication in itself of what our possibilities are, especially when it is considered that our total output amounts to nearly 2,000,000 lbs. annually, and that this output is steadily increasing every year.

Now, in the eyes of the British buyer the percentage of wool equal to Australian which we turn out is small, but the *actual* percentage is in reality greater. Its proper market value, however, is not realised because it is mixed with all sorts and conditions of wool, is unskirted and is not graded. This brings us to the second division of the subject, namely, the question of the improvement of our wool. A careful perusal of the article we publish this month will show that the improvement in our wool which is necessary in order to enable us to realise better prices must be carried on along two lines: (1) The better preparation of the wool on the farm before marketing; and (2) better attention to breeding. As regards the first of these points, the lengthy quotation which we give from the letter from the Hamburg firm gives a very good idea of the principles of grading and skirting, their necessity, and their effect upon the price of the wool treated.

"The aim of skirting and classing should be to give the wool evenness of character," the letter runs, in part. "Therefore, whether the wool be of high or inferior character, all those parts of the fleece which could alter or seriously influence its main character—be it quality, growth, colour, yield, or freedom from faults (as seedy or burry)—must be taken off."

It is this attention to appearance and grading that makes the difference between low and high prices. Grading may not raise the price of the less valuable portions of the wool, but it will certainly not lower it; and furthermore, by separating out and packing separately these inferior pieces, we enable the better wool to realise a considerably higher price—a price nearer its true market value. An important point to remember is, that wool, whatever its quality, cannot realise its proper market value in open competition when it has mixed with it wool of inferior quality. Therefore, says our Hamburg authority—

"Farmers should sort their clips in (1) fleeces, (2) bellies, and (3) locks and pieces; and pack these three classes separately, marking the bale accordingly."

If the farmer is disposed to go further than this, and adopt a more detailed system of classification—and he will find it will pay to do so—he will find useful the advice tendered by the London firm from whose letter also we give a lengthy quotation. Here we have three systems of classification, the most detailed of which contains specification of twelve classes.

Such classification—combined, of course, with careful skirting—will raise the standard of our wool considerably and will consequently bring the farmer higher prices. But this is not the only means we must em-

ploy to raise the standard of Natal wool. We must pay more attention to breeding in order not only to maintain but also to increase the quality and length of staple of the wool. We must, as occasion offers, introduce new blood from good strains of wool sheep. This is a matter which will, of course, take time for results to be observed, but it must be seen to if our wool is not to deteriorate and is, furthermore, to improve.

An important question, and one over which there has been considerable controversy during the last two or three years particularly, is the question of the deteriorating effect upon wool of the use of the caustic soda and sulphur dip. Since August last, when we first broached the subject in these pages, we have devoted a considerable amount of space to the publication of views of experts both for and against the use of this dip, but so far we have not ourselves ventured to express any definite opinion on the subject, and although we print in this issue further expressions of opinion—collected by Mr. Harrison—we still do not feel ourselves justified in expressing an opinion either one way or the other. We would, however, draw attention to the last of the views which we quote in the article in this issue we have been referring to, in which the writer states:

“Except in cases where it has been improperly used, the wool has not suffered from the caustic soda and sulphur dip.”

It is just possible that this view of the question indicates the crux of the whole matter. Possibly the dip has in some cases been used too frequently, with the result that the dip has been blamed instead of the user of the dip. However that may be, readers will find the views we publish of interest as further contributions to the discussion of the question, and they will doubtless be glad that Mr. Harrison made a point of getting opinions on the matter in the course of his enquiry.

Pigs suffering from scours may be helped and many times cured by feeding them with milk that has been boiled and to which a pint of scorched flour has been added for each gallon.

LUNGSICKNESS.—Proclamation No. 77, 1908, declaring the farm “Riet Vallie,” Bergville Division, to be an infected area under the Lung-sickness Prevention Act, 1897, has been revoked.

The Maize Crop in April.

We have very little change to report since our last issue—so little, in fact, as not to affect the probable total crop at all. In our last issue we announced that the condition of the crop (*i.e.*, on the 31st March) was 2.69—or between “fair” and “average.” This represented a probable yield of 4.63 muids to the acre, or a total crop of about 770,000 muids. We find that, whilst the average condition of the crop has not fallen back any further, it was very little better on the 30th April (the date of our latest reports) than at the end of March. The average condition at the end of April was 2.7, as compared with 2.69 in March. The probable crop thus remains about the same.

For the purposes of comparison we again set forth the average condition of the crop, the yield per acre that condition represents, and the total crop promised thereby, at the end of each of the months, December, January, February and March, adding thereto the figures for April:—

		Condition.	Yield per acre.	Probable total crop.
At End of—			Muids.	Muids.
December	...	2.7	4.7	780,000
January	...	3.1	5.34	886,000
February	...	3.0	5.16	856,000
March	...	2.69	4.63	770,000
April	...	2.7	4.65	770,000

Using the figures 1, 2, 3 and 4 to represent the conditions “Poor,” “Fair,” “Average” and “Above the Average,” we have prepared the following comparative statement, which will doubtless prove of interest to the reader, as showing the progress or otherwise the crop is making in each of the Magisterial Divisions of the Colony. The condition represented by the figures 2.7 will serve as an example in order to illustrate our method. The figure “2,” it will be remembered, represents the condition described as “Fair,” whilst “3” represents “Average” condition. Thus 2.7 will represent an *average* condition of from “Fair” to “Average,” but a little nearer “Average” than “Fair.” This does not mean, of course, that all the crops in that Division may be described as 2.7 in condition. In fact, it may easily be that not a single field is of such condition. The meaning is that, taking the crops as a *whole*, their condition is something a little more than midway between “fair” and “average.”

CONDITION OF CROP.

(Note.—A condition “above the average” is represented by the figure 4; “average” by the figure 3; “fair” by the figure 2; and “poor” by the figure 1: intermediate figures represent corresponding conditions.)

Division.	Condition of Crop at End of—				
	Dec.	Jan.	Feb.	Mar.	April.
Lower Umzimkulu ...	2·7	3·0	2·7	2·5	2·5
Alexandra ...	2·5	4·0	4·0	3·0	3·0
Umlazi ...	3·0	3·0	3·0	2·5	2·0
Inanda and Indwedwe ...	3·0	4·0	3·0	2·0	3·0
Lower Tugela and Mapumulo	2·0	4·0	3·0	2·0	3·0
Impendhle ...	3·0	3·0	3·0	3·0	3·0
Alfred ...	3·0	4·0	3·4	4·0	3·0
Ixopo ...	2·4	4·25	3·5	3·0	2·75
Richmond ...	2·5	3·0	3·0	2·5	2·0
Umgeni ...	3·0	3·5	4·0	3·2	3·4
New Hanover ...	2·0	2·75	2·4	3·0	3·0
Lion's River ...	3·0	3·0	2·5	3·0	3·0
Umvoti ...	3·7	3·2	3·2	3·5	3·4
Krantzkop ...	3·0	2·0	4·0	3·0	3·0
Underberg ...	4·0	3·0	2·4	2·5	3·0
Polela ...	3·0	4·0	4·0	4·0	4·0
Bergville ...	3·0	2·7	2·0	2·4	2·4
Estcourt ...	2·7	2·9	2·5	2·0	2·7
Weenen ...	3·0	2·0	2·0	2·0	2·0
Klip River ...	2·8	2·6	2·75	2·4	2·0
Umsinga ...	2·0	2·5	3·0	2·5	2·0
Dundee ...	2·0	1·7	2·0	2·0	2·0
Newcastle ...	3·0	2·9	2·8	2·3	2·3
Vryheid and Ngotshe ...	2·5	2·0	3·0	1·0	1·0
Utrecht ...	—	4·0	3·0	2·0	3·0
Babanango ...	—	—	—	2·0	1·0
Eshowe and Mtunzini ...	3·0	2·5	3·0	4·0	2·0
Emtonjaneni ...	2·0	3·4	3·4	3·0	3·0

The figures in this statement show how the crop has been faring, month by month, in the different Magisterial Divisions. It may be of interest also to compare the average condition in each of the geographical belts at the end of February, March and April, which is done in the following statement:—

	Condition of Crop at end of—		
	February.	March.	April.
In the Coast Belt ...	3·5	2·6	2·9
In the Midland Belt ..	3·3	3·1	3·0
In the Upland Belt ...	2·6	2·2	2·3

EXPORTABLE SURPLUS.

Whilst we have not been able to institute any really systematic inquiries as regards the extent of the Natives' crops this year, it is admitted on all sides—and the reports that we have received confirm the opinion—that the crop will be larger than usual this year. Whilst many reports state that the Natives will be able to sell to a considerable extent this year, we prefer to be conservative and reckon on the fact that the Natives will at the least be able to support themselves this year. We have made careful calculations, and we think we can safely say that the Natives' and Indians' crops (the latter, of course, is a comparatively small crop) together will amount to about 900,000 muids.

The fact that the Natives will support themselves this year enables us to discuss the European crop without any reference to Natives' wants. Now the next point that requires clearing up is the question of the European consumption of mealies—that is to say, what portion of the European crop, which we estimate at 770,000 muids, will be required for consumption in the Colony—remembering that we have not now the Natives to consider? Recognising the great importance of this question, we have been engaged since the beginning of this year in making very careful inquiries of the farmers themselves. We prepared a special form and sent a copy of it to every European farmer in the Colony, with a request that he would kindly fill it in and return it to us without delay. This form sought to obtain an idea of the quantity of mealies consumed annually on each farm in the Colony. We are glad to say that the farmers have responded willingly to our request, and for weeks past the forms have been coming in fast. They are not all in yet, but we are in a position to give readers a tolerably accurate idea, we think, of the quantity of mealies consumed on European farms in the Colony every year. It may be remembered that two years ago we estimated that the consumption was something like half a million muids, and since then that estimate has been ridiculed by one large firm of grain exporters in particular. We find, however, that we were not so very far out, for the estimate which we have made now upon the returns we have received from farmers makes the European consumption about 350,000 muids. This must not be taken as final, because we have to base this estimate upon a limited number of returns, but a sufficient number to enable us to obtain a fairly correct idea of what the consumption is. To this figure must be added the consumption in towns, an estimate of which we are now obtaining, but for the purpose of calculation we may call the total European consumption of the Colony about 400,000 muids. Deducting this from 770,000 muids, we thus shall have about 370,000 muids for export, oversea and overland.



“Traffics and Discoveries.”

IN this issue we revive an old and popular feature of the *Journal* in a new garb. “Interviewing” is one of the best methods of giving farmers an opportunity of voicing their opinions and experiences for the benefit of others, particularly of the younger generation. The writing of articles is not a matter which comes within the scope of the ordinary farmer’s sphere of work; to him it is more or less of a task to set down his ideas in a readily intelligible and interesting form, and however much he may at times feel disposed to publish results of some of his experiences for the benefit of his fellow-farmers, being a busy man, he can rarely find the necessary time for the preparation of an article. Such being the case, “interviewing” is the next best method of obtaining his experiences for publication.

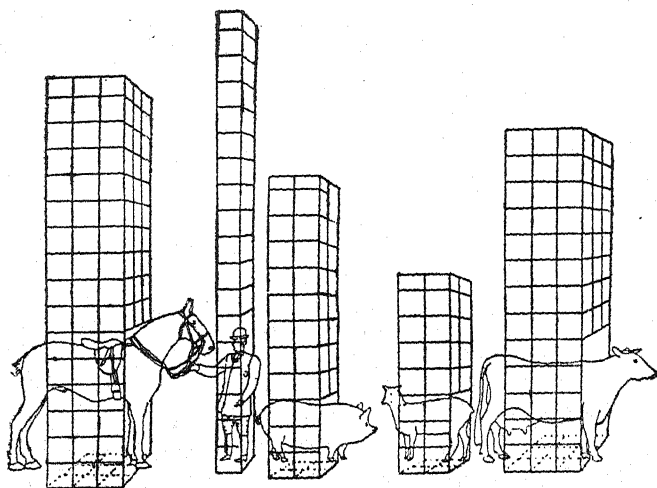
As the title we have chosen for our interviews—“Traffics and Discoveries”: for which we are, of course, indebted to Mr. Kipling—shows, our idea is to publish not only notes of interviews but also miscellaneous notes on topics of interest that come to the notice of our travelling representative. We commence the series in this issue with a “A Chat with a Vryheid Farmer” and “A Day at Cedara”; and it is our desire, so far as we are able, to present our readers with one or two interviews each month, together with odd notes on matters of interest. We shall be glad to hear from any progressive farmers who might be willing to allow our representative to visit their farms and “interview” them.

Photographs of Umkwahumbi Tobacco Fields.

With reference to the illustrations of tobacco fields in the Umkwahumbi Valley which we published in our last issue, we are now informed that the photographs from which the blocks for these illustrations were made were taken by Mr. P. de S. Gwattin, who has been with Mr. J. W. V. Montgomery, of Ismont, Mid-Illovo, as a farm pupil, and who goes to Cedara Agricultural College in July. By an oversight we were not informed of this fact when the photos were sent to us.

Ventilation.

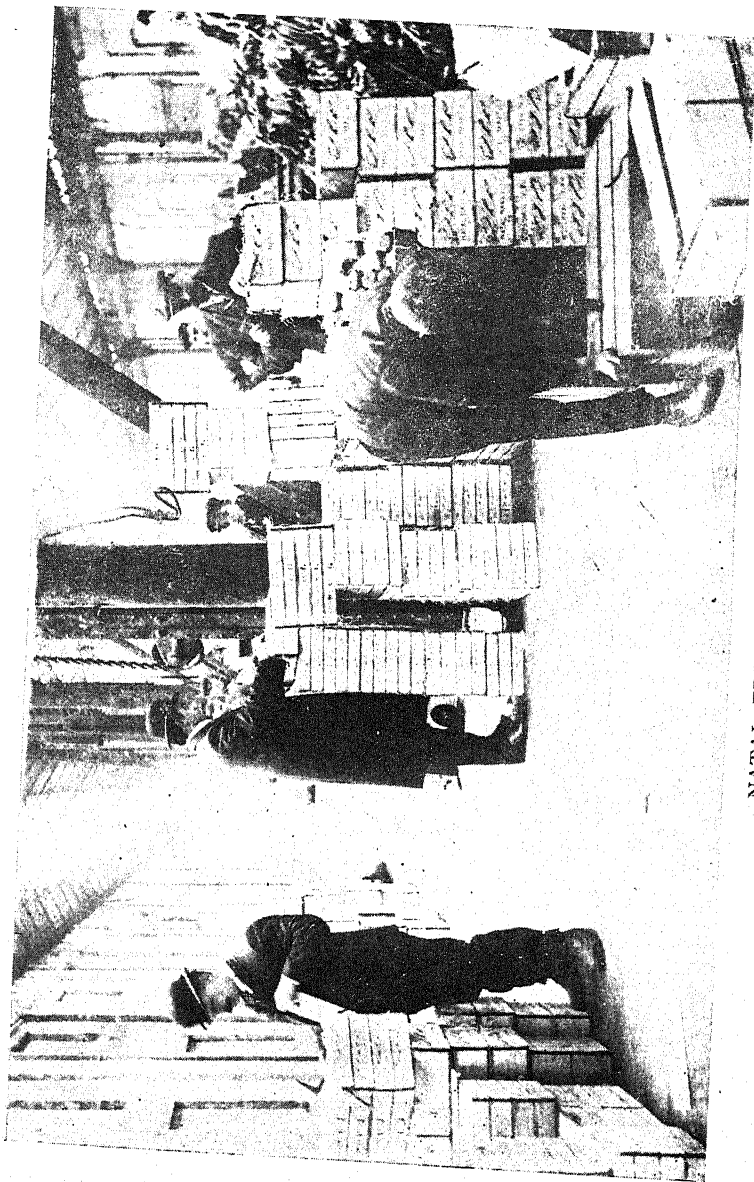
The accompanying diagram, which we reproduce from the *Agricultural Gazette* (London) of the 22nd March, illustrates in an interesting manner the amount of air breathed by a man, a horse, a pig, a sheep, and a cow, respectively, in one hour. This air should be nearly pure to keep the body in health; and it shows very forcibly the necessity for adequate



ventilation. The horse, we learn, uses 141·7 cubic feet of air per hour or 3,401 cubic feet every 24 hours; the cow uses 116·8 cubic feet per hour or 2,804 per 24 hours; the pig uses 46 cubic feet per hour or 1,103 per 24 hours; the sheep uses 30·2 cubic feet per hour or 726 per 24 hours; man requires 17·7 cubic feet per hour or 425 per 24 hours; and the hen uses 1·2 cubic feet per hour or 29 per 24 hours.

Wattle Bark in Victoria.

We learn from *Commercial Intelligence* of the 21st April that the Master Tanners and Leather Manufacturers of Victoria have not been able to comply with the condition laid down by the Government that they should guarantee a fixed price per ton for all wattle bark grown by the Government during a term of years, in connection with the Association's request that the Government should provide an adequate supply of home-grown bark. The Association has forwarded a letter to the Minister of Forests stating that while the members of the Association will always be willing to pay the highest price of the day for all bark for sale by the Government, they cannot guarantee any fixed price. At present tanners are paying fancy prices for bark, and many members of the Association have been compelled to reduce their output of leather for export solely on



NATAL FRUIT IN LONDON.—II.

The Commercial Agent (Mr. Francis Harrison) inspecting fruit on arrival.

account of their inability to secure sufficient supplies of wattle bark. The Association considers that its request can be justified on sound business lines, as at £6 per ton it pays the landowner handsomely to grow wattle bark and "there is practically, if not absolutely, no possibility of the price ever again going below £6." It is further urged that if in years to come, as a consequence of the planting of large areas with wattle by the Victorian Government, the supply should exceed the local demand, there will always be a sure and profitable outlet for any surplus in London, where the present quotation for good Australian bark is £10 10s. The Association therefore reiterates its request that the Government should largely increase the area of its wattle plantations.

Inquiry re Pipe-Calabashes.

We shall be glad to hear from any merchants and others in Natal who would be willing to purchase pipe-calabashes from farmers for export. We are beginning to receive enquiries from farmers as to a local market for these calabashes, and we should like to have the names of persons prepared to negotiate with a view to purchase in this line.

Canadian Binder Twine Industry.

We have received from the Canadian Trade Commissioner in Durban a copy of a special report on the Canadian binder twine industry recently made to his Government by the Inspector of the Binder Twine Industry of Canada, which throws some interesting light on the industry and gives evidence of the rigid adherence by the manufacturers to the high standard of excellence which has been the rule in the past. Owing to the climatic conditions existing in the north-western provinces of Canada, where the farmer is dependent almost wholly on his grain crops—the safety of which, owing to the danger from hail, frost and drought, is a constant source of anxiety—it can be readily understood how important it is that when his crops ripen no delays should occur to interfere with his harvesting them as quickly as possible. In view of these conditions nothing but a first-class binder twine meets the demand in that country. "The manufacture of binder twine," indeed, says the report, "which in most countries is only an art, has been reduced to a science in Canada."

In order to prevent possibility of fraud in the manufacture and sale of binder twine, an Act was passed in 1902 in Canada providing for correct marking of binder twine and heavy penalties for violation of the Act. The rigid enforcement of this Act has revolutionised the whole twine situation in Canada. Prior to the Act, the report before us states, only a small proportion of the twine sold in Canada was correctly marked, and in very many cases serious loss was suffered by the consumer. Many

cases were found where twine measured 10 to 20 per cent. less than it was marked. Under the changed conditions Canadian binder twine has established for itself a reputation in the world's markets. "In fact, Canadian binder twine in the market claims rank similar to 'Scotch tweed' in the cloth market." Canadian mills are now exporting twine to many foreign countries, including Russia, Roumania, Argentina, Australia, and England, Scotland and the United States of America. The exports of twine in 1908 amounted to 1,992 tons, valued at about £319,680. The twine actually turned out by the Canadian mills for the season 1908 was 14,929 tons.

Glanders and the Importation of Equines.

On account of the existence of glanders in Cape Colony, it has been deemed expedient to prohibit the importation of horses, mules and donkeys from that Colony into Natal, and a Proclamation on the subject (No. 36, 1909), has accordingly been issued. The importation, directly or indirectly, of horses, mules and donkeys has been prohibited (under Law No. 12 of 1866 and the Animals Diseases Act of 1894), but notwithstanding this prohibition, healthy horses, mules and donkeys may be imported into Natal from Cape Colony, provided that permission in writing is first obtained from the Principal Veterinary Surgeon, Pietermaritzburg, Natal, and that the animals are submitted to the mallein test at some place in Natal to be determined by the Principal Veterinary Surgeon in Natal. Should they react to this test they will be destroyed and no compensation will be payable. Such permission will be subject to such conditions as the Principal Veterinary Surgeon of Natal may see fit to impose, and the owner of the animals will be required to arrange, at his own expense, for any veterinary examination for which such conditions and this Proclamation provide. The necessary mallein test must in every case be conducted by a qualified veterinary surgeon holding the diploma of the Royal College of Veterinary Surgeons, England.

Horse, mules, and donkeys engaged in constant movement across the border, or which have recently come from Natal, or are returning thereto, may also be allowed to enter the Colony with the consent, in writing, of the District Veterinary Surgeon or other officer deputed by the Principal Veterinary Surgeon, Natal, which may at any time be withdrawn. Race-horses in training will be allowed to enter the Colony on a certificate of health signed by a qualified veterinary surgeon, holding the diploma of the Royal College of Veterinary Surgeons, England, but they will be subjected to the mallein test on arrival at their destination, or at any time thereafter, if found necessary, and in terms of Act No. 16, 1899, no compensation will in such case be payable if they should be destroyed.

Irrigation Congress, C.C.

The South Africa Irrigation Congress opened on the 18th May at Capetown, with Mr. Merriman in the chair. There were over 80 delegates present. In his opening speech, reported by *Reuter*, Mr. Merriman said he hoped that united South Africa would show the world what its yeoman could do. The genesis of the Congress was to be traced to America. He hoped it would be the beginning in a small way of similar work. He heartily welcomed the Congress as being in the direction of building up, strengthening and maintaining agriculture in South Africa. Mr. Wessels, the O.R.C. Commissioner of Works, Dr. Smartt, Mr. Malan, and the Hon. Mr. H. C. van Zyl also spoke.

Mr. Kanthack, Cape Irrigation Expert, attributed the alarming deterioration of land as well as population to "the demoralising effect of a too easy life on farms, bounded by high points on the sky line, aggravated by the curse of black labour." He condemned the backwardness and ignorance of many farmers and the spirit of speculation which had grown up. He urged the importance of a practical and thorough system of education in irrigation. During the discussion strong disagreement on the undesirability of large schemes was expressed by the delegates, while larger Government subsidies were advocated for irrigation schemes. Mr. Oosthuisen, M.L.A., one of the South African delegates to the International Irrigation Congress, held in 1908, in New Mexico, delivered an address on "water storage as a factor in irrigation." He dealt with his experience in America, India, and other irrigated countries. The question of the formation of a South African Association of Irrigation was dealt with in committee.

On resumption on the second day of the Congress, the Rev. B. Marchand, of Rondebosch, one of the founders of Kakamas Labour Colony, read an interesting paper on the labour colony irrigation settlements under the direction of the Rev. Christian Schroeder, who was succeeded by Mr. Lutz. A furrow 18 miles long, 10 feet broad, was constructed entirely by poor white labour on the south bank of the Orange River. At Kakamas one 24 miles long and 12 feet wide is now under construction on the north bank. The cost was £700 per mile in the case of the former, and £800 for the latter. The settlement consisted of about 170 families, or 1,500 people, and was in a most flourishing condition, producing splendid crops of wheat, mealies, oats, oathay, lucerne, beans, and fruit. It was also proposed to establish tanning and boot-making industries. Mr. Marchand caused amusement during the subsequent discussion by saying ostrich farming should not be encouraged lest the settlers fall back into their former indolent habits. He thanked

the irrigation expert, and paid a high tribute to the success at Kakamas, which was the most difficult work he had ever seen attempted in South Africa, whether from the engineering, irrigation, or social point of view. The moral and educational effect of such settlements on the poor whites could not be overestimated. Professor Hahn, of Capetown, read a paper on the physical relations of water to different kinds of soil, and their applications in agriculture. In our next issue we hope to publish a detailed report of the proceedings of this Congress.

A New Fibre Machine.

We have, from time to time, published information relative to new machines for the extraction of fibre, and we have still another addition to make to the list. *Agricultural News*, of Barbados, refers in a recent issue to a new machine, for which many advantages are claimed, that has lately been invented and put on the market in Mauritius. The chief fibre plant of Mauritius, and one which is cultivated on a fairly extensive scale in that island is, of course, *Furcraea gigantea*.

It is claimed for the machine in question that all the fibres of the plant dealt with are extracted in their full length, and in clean condition; there is no waste whatever of the fibre. The machine, it is stated, works automatically, and when a regular supply of leaves is provided, all the processes of defibration are carried out without human assistance. In an average day's work (10 hours) it is said to be capable of turning out 1 ton of dried *Furcraea* fibre, the force required being about 10-horse power. In Mauritius the price of this machine is about £300. It is stated that its cost might be reduced in certain other countries. The inventor is M. Maingard, and the machine is known as "Maingard's Automatic Defibrating Machine." It is affirmed that in addition to *Furcraea* the machine is equally capable of dealing effectively with leaves of sisal hemp, Manilla hemp, *Phormium tenax* (New Zealand flax), etc.

East Coast Fever Regulations.

Since our last notes on East Coast Fever regulations and restrictions a number of fresh notices have been issued by the Minister of Agriculture. All movement of cattle has been stopped within or from the Magisterial Divisions of Ixopo and Umgeni (G.N. No. 206), Inanda, Mapumulo, and Lower Tugela (G.N. No. 223), Maritzburg City and Durban (G.N. No. 224), Alfred and Lower Umzimkulu (G.N. No. 226), and Alexandra, Bergville, Camperdown, Dundee, Estcourt, Ipolela, Impendhle, Krantzkop, Klip River, Lion's River, Umvoti, Unlazi, Umsinga, Utrecht, Newcastle, New Hanover, Richmond, and Wenen (G.N. No. 229).

Notwithstanding these prohibitions, however, healthy cattle intended for immediate slaughter may be moved from one place to another within any of the said Divisions on permit granted by the Chief, Veterinary Division, or by an officer appointed by him to issue such permits, and cattle may be removed from any of the said Divisions on permit granted by the Chief, Veterinary Division; but the removal can only be made within the time and according to the directions contained in the permit, and not otherwise. In terms of Act No. 32, 1903, any person disobeying this order is liable to a fine not exceeding £100, or to imprisonment, with or without hard labour, and with or without the option of a fine, for any period not exceeding six months.

The Minister of Agriculture has also ordered (Government Notice No. 239) that no movement of cattle within native locations and native reserves situated in districts in which the movement of cattle has been prohibited, or in districts in which such movement may hereafter be prohibited, shall be allowed to a greater distance than two miles from where they have been previously pastured or watered, except under permit granted by the Chief, Veterinary Division, or by an officer authorised by

The removal of heads of cattle, hides, horns, hoofs, hair, cut grass, manure and litter, from places where cattle are kept, has been prohibited (except by permit from the Veterinary Department) in respect of the Magisterial Divisions of Ixopo and Umgeni by Government Notice No. 208, and in respect of the Magisterial Divisions of Alexandra, Bergville, Camperdown, Dundee, Estcourt, Ipoela, Impendhle, Krantzkop, Klip River, Lion's River, Umvoti, Umlazi, Umsinga, Utrecht, Newcastle, New Hanover, Richmond, Weenen, Pietermaritzburg City, Durban, Alfred, Lower Umzimkulu, Inanda, Mapumulo and Lower Tugela (the last three Divisions from and after 1st June), by Government Notice No. 225. The removal of manure and litter from places where cattle are kept has also been prohibited in respect of the Magisterial Divisions of Ixopo and Umgeni (Government Notice No. 225). All permits issued by Advisory Committees, District Committees, and Permit Officers appointed by such committees, for the removal of cattle, hides, horns, hoofs, hair, and heads of cattle, cut grass, manure and litter from places where cattle are kept, have been cancelled (by Government Notice No. 241) and become null and void in the Magisterial Divisions of Umgeni, Ixopo, Alexandra, Bergville, Camperdown, Dundee, Estcourt, Ipoela, Impendhle, Krantzkop, Klip River, Lion's River, Umvoti, Umlazi, Umsinga, Utrecht, New Hanover, Richmond, City of Pietermaritzburg, Durban, Weenen, Alfred, Lower Umzimkulu, Inanda, Mapumulo, and Lower Tugela (the latest three from and after the 1st June).

On the 20th April, by Government Notice No. 207, the Minister of Agriculture ordered that all cattle on the Greytown Commonage, Umvoti Division, were to be forthwith branded "G" on the right shoulder, before the 1st May, 1909. Government Notice No. 230 incorporates, for the purpose of the East Coast Fever Acts, the farm Remainder of Boschman's Klip, Bergville Division, with the Magisterial Division of Estcourt; and in like manner the farm "Assegai Kraal," in the Camperdown Division, has been incorporated (by Government Notice No. 228) with the Umlazi Division.

The zone marked off with flags alongside the outside boundary of the Greytown Commonage, and the zone similarly marked off along the Camperdown side of the divisional fence between Umgeni and Camperdown Divisions from the Government fence on the farm Spitzkop to the beacon of the portion of the farm Uitvlucht, occupied by Mr. G. C. Phipson, have been declared (the former by Government Notice No. 240 and the latter by Government Notice No. 251) to be zones within the meaning of the East Coast Fever Act, 1903, and no cattle will be allowed to enter or be in either of these zones.

Under Government Notice No. 312, 1908, the Minister of Agriculture declared the main line of railway between Padley's Station and the Transvaal Border to be a fixed quarantine boundary in terms of the East Coast Fever Acts. In the place of this boundary, the following boundary line has been substituted (Government Notice No. 227):—The Main Line of Railway between Alverstone Station and the point where the double fence of the Town Lands of Newcastle, on the east of the Main Line of Railway, joins the railway fence, thence along said double fence on the Town Lands of Newcastle, on the east of the Main Line of Railway, to the point where the said double fence again joins the railway fence, thence along the Main Line of Railway to the Railway Crossing at Mount Prospect Station, on the farm Sampson's Klip, thence along the fence on the east of the Charlestown Main Road to the junction of the said fence with the fence on the farm Coothill, thence along the fence on the southern boundary of the farms Coothill and Armagh to the Buffalo River, and thence along the fence up the Buffalo River to the junction of the said fence with the Transvaal Border fence at Drystream.

Fruit Culture in the United States.

A correspondent sends us the following interesting notes on fruit culture in the Western United States:—An enormous quantity of Newton Pippin apples arrive in the English markets from Oregon and California, U.S.A., from Xmas onwards. In those parts this apple is a great

favourite and is extensively grown. The country is an ideal one for fruit growing. It is situated on the Pacific coast, is well watered by numerous rivers, a warm and fairly dry climate and a good, rich soil. The district is very mountainous, the highest of which is perpetually capped with snow. Valleys are therefore very plentiful, and as the soil of these is composed of disintegrated volcanic rocks it is marvellously rich and fertile.

The plantations are very large, some of them hundreds of acres in extent. The trees appear to be healthy, vigorous and flourishing well, and are grown on the half-standard system so extensively grown in the English orchards. In planting an American orchard of Newton Pippins especially, particular attention is paid to the selection of the site. The planter has found by experience that this apple succeeds best in a mountainous district, where the climate is dry and free from fogs, and the soil a good, deep, and dark loam. The ground is well ploughed and cultivated for some time before planting; and just before the trees are put in it is subsoiled to the depth of 3 feet. Planting is done in the fall of the year, the trees being placed not less than 30 feet apart each way. The greatest care is taken in the selection of the trees, being closely examined to see they are entirely free from disease. One-year-old trees are preferred. From the first the ground is annually ploughed and harrowed in spring and frequently cultivated from then to August. They are skilfully pruned each winter, the lower branches are trimmed so as to allow teams to pass easily beneath, the centres are kept well thinned to admit plenty of sunlight, and the ends of the branches in order to give the latter sufficient strength to carry enormous weight of fruit borne each year.

A great amount of attention is paid to the safeguarding of the trees from attacks of insects and fungoid pests; they spray the trees twice a year. In late winter or early spring, before the leaves appear, the trees are thoroughly sprayed with sulphur and lime or copper solutions. Then when the trees are in bloom, they are again sprayed with Paris green, or London purple, the operation being repeated at intervals of five weeks, until at least six applications have been made, which results in clean trees, healthy growth and sound crop. A paying crop is not expected before eight to ten years.

To ensure an even crop of samples the fruit is thinned out when it attains a fair size, leaving one sound apple to about every six inches. This is done by the thinners who go over the trees with shears. Thus,

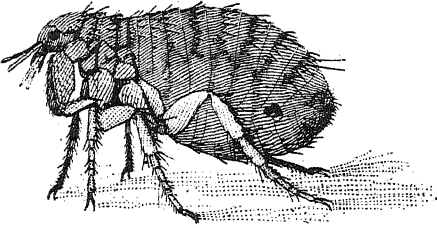
the vitality of the tree is concentrated upon the production of large, evenly-formed, high-class fruit, which scarcely needs any grading, and which always command a good price.

The fruit is gathered the first two weeks of October. The men go forth with ladders and baskets and pluck the fruit, avoiding bruising it in the slightest degree. It is then taken to the warehouse in wagons and there packed by girls who have been thoroughly trained to the business. All bruised, worm-eaten, ill-shaped or under-sized fruits are rejected; at the same time it is graded into two qualities. Each fruit is wrapped in paper and placed in a paper-lined box, each layer of fruit is separated by a sheet of cardboard or paper and then nailed and labelled. They are then conveyed to the railway in spring wagons and loaded into a refrigerator railway wagon, being allowed proper ventilation, each wagon holding about 600 boxes; they are taken to New York and there put on the ships for England.

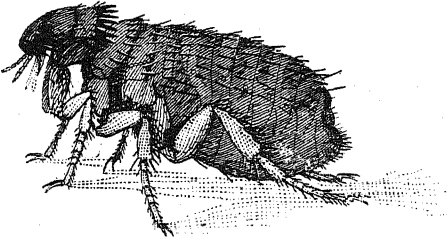
One of the primary practical uses of good tilth is to supply a proper seed bed. It is important with all young seedling plants to give them a good start in life, as it were, for if stunted in the critical early stages nothing will make up afterwards for the damage done. The production of a loose, mellow, friable surface is particularly desirable for a seed-bed, and for this reason early tillage is necessary. When the soil has been ploughed or otherwise cultivated in sufficient time to permit of the action of the weather—and particularly that of frost—on it, then it falls into a nice mealy state very suitable for further tillage in the spring time. If on the other hand, the cultivation is done late, and especially if the soil is wet, then we have the formation of clods, and the soil is left lumpy, and it may take a whole season to cure this, while the crop suffers accordingly. Frost is the greater producer of tilth, and nothing done by implements and any amount of labour can equal the effect of it. The expansion of the moisture in freezing breaks open the lumps, clods, and pieces of soil in a way that nothing else can do. To get the full benefit of frost, however, it is necessary to have the ploughing done in the autumn and early winter, and therefore good farmers always try to have this work well forward.—*Primrose Connell, B.Sc. ("Soils: Their Nature and Management").*



FOOT OF DOMESTIC FLEA.
(After Froggart).



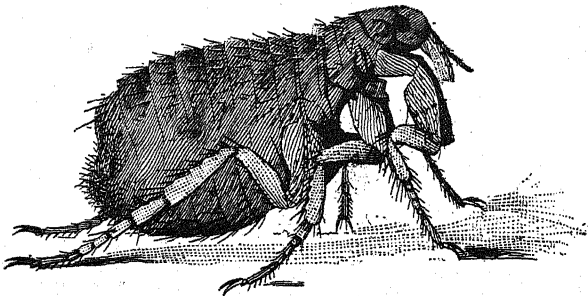
RAT FLEA.
(After Froggart).



DOG FLEA.
(After Froggart).



LARVA OF
DOG AND CAT FLEA.
(After Kunckel).



DOMESTIC FLEA.
(After Froggart).

A Note on Fleas.

By ALBERT KELLY, F.E.S., Assistant Entomologist.

We live in such an age of scientific progress that it is hazardous to make any statement as to which of the Sciences has made the most progress within the last decade or two.

The recent work of the bacteriologist has, perhaps, come most before the public, because of the many startling and undreamed of discoveries associating bacteria and other micro-organisms with the most dreaded of diseases amongst men and animals, and, more recently, showing how in one way and another, these diseases are distributed and communicated by insects.

Thus we find that a mosquito is the agency through which Malaria and other diseases are transmitted, the spread of many animal diseases is dependent upon the ticks, a fly is the temporary host of the trypanosomes of Sleeping Sickness and Nagana, whilst fleas act as carriers of the terrible Bubonic Plague, which is so rampant in India, and whose occasional outbreaks in other parts of the world have, in the past, been attended with such a tremendous loss of human life. During the first six months of 1907, 1,060,000 deaths from plague occurred in India, and it must be realised that this long death-roll is, in a way, the result of the work of this tiny, insignificant, but none the less efficient, inoculator of the "Black Death." This by the way.

Fleas are all blood-sucking parasites of either mammals or birds, and they are of many species. They were long classified as a family of the order Diptera, being looked upon as wingless and otherwise degenerate flies. Fleas are, however, only degenerate in the biological sense of the term, inasmuch that they do not exhibit such complexity of structure as do their nearest allies, the flies; in the loose acceptance of the term they are by no means degenerate. They are particularly adapted to their mode of life, and, whilst the absence of wings and the power of flight puts them apparently on a lower plane than the flies, the peculiar flattening of the body and their jumping organs regain, by their intricacy, any loss of position.

We find very much the same thing in the general references to fungi as degenerate plants; here the term is also used in its biological sense, because it must be borne in mind that these lowly plants exhibit remarkable specialisation whereby certain modifications enable them to obtain their food supplies already assimilated and without their having the trouble to collect and digest it for themselves.

Nowadays entomologists generally agree to recognise the fleas as a

separate order (the *Siphonaptera*—the wingless syphons), of which 150 species are at present known. Those which contribute most to man's personal annoyance are the dog, the cat, and the house flea, whilst the notorious Jigger must not be omitted from this list. The last mentioned is, however, easily dealt with, but the "domesticated" fleas are frequently very troublesome, and it is because of the many complaints that have recently been received that this note is penned.

The structural characteristics to which reference has been made consist in the absence of the wings, the extraordinary compression of the body—not dorsally, as with most insects, but laterally—and the modification of the mouth parts for piercing and blood letting.

The eggs are laid, in the case of the cat and dog flea, on the hairs of its host, but, contrary to the usual custom amongst insects with similar habits, the egg is not glued or fastened on in any way, and hundreds of them may be found on mats, etc., which the animals frequent. The house flea deposits her eggs amongst the dust and dirt in crevices in the floor, cushions, etc.

The larvae are whitish, worm-like creatures with fairly well developed mouth-parts. They do not, however, attack their host in this stage, but feed on near by debris. The larval period may, under favourable conditions, be completed in seven days, at the end of which period the maggot pupates, and a further eight days may witness the emergence of the perfect insect. An entire generation has been developed in a fortnight, but, striking a mean average, it is possible that the usual generation occupies four or five weeks in coming to maturity. Even at the latter rate development is not slow, and under favourable conditions, but a short time need elapse for a place to become greatly infested.

Domestic pets are often grossly infested with fleas, and dogs and cats are chiefly responsible for the numbers in houses, more especially when they have or make their sleeping quarters on mats in, or in close proximity to, the house. In such cases the free use of Pyrethrum powder is recommended, and the dogs should be washed with a strong carbolic soap every other day.

Numerous very bad cases of flea infestation have been observed in stables, kraals, and fowl runs, the insects feeding upon the usual habitants of such quarters and breeding enormously in the organic debris of the floors. As often as not, where such quarters are near the house, the fleas emigrate, or are transported in numbers into the house, and become an intolerable nuisance. Calf-pens and hen's nests, it may be mentioned, are often hotbeds of fleas.

TREATMENT

In dealing with an infestation, it is often profitable to investigate such places as those enumerated, with a view to ascertaining whether the

real source of the trouble is not so located. If this proves to be correct, the cleaning up and burning of as much debris as possible, followed by a liberal application to the floors of a solution of arsenic, to which some Cyllin or some such other strong disinfectant may with advantage be added, is recommended.

In washing the floors of the house a little carbolic acid in the water has been recommended, but it is thought that the thorough soaking of infested localities with the arsenic solution would be attended with the best results.

A rather curious idea for the riddance of the adult fleas was conceived by an American entomologist, and its adoption is said to be attended with much success. Pieces of fly paper are tied round the legs of a hired man, sticky side out, who has then to tramp round and round the room collecting the jumping fleas on his leggings of gum, and from which, of course, all efforts to escape are in vain. This is a simple method, but very often such a one constitutes the only and really the most efficient recommendation to be made.

The idea of this walking death-trap, so to speak, may appeal to one's sense of the ludicrous, but it is to be remembered that a man troubled with fleas shares one thing in common with his tiny enemy, and that is this self-same lack of humour. He becomes a Shylock, and it is hoped that one or other of the above suggestions for the control of fleas will enable him to exact his pound of flesh.

TICKS ON DOGS.—Valuable dogs are often killed owing to the attacks of scrub (not cattle) ticks. If the ticks are promptly removed a dog will usually recover, but if they are not detected the animal rarely survives. In the case of woolly-haired dogs the insects are difficult to find, in which case the dog may be sheared and the ticks removed. They should not be forcibly pulled off, as the mandibles are invariably left in the animal's skin, and the mischief goes on. Insects breathe through their bodies, hence, if the pores are closed by the application of oil, turpentine, or kerosene, the tick dies, and may be extracted entirely. If the ticks cannot be found, the following dressing will be of some service:—Soft soap, 4 oz.; kerosene, one teacupful; water, one quart. Boil the soap and water together until the soap is dissolved. When cool, add the kerosene, and agitate the mixture thoroughly for five minutes with a rod. Wash the dog all over with some of this mixture. Give internally 3 to 10 grains of iodide of potassium in two tablespoonfuls of water.—*Queensland Agricultural Journal*.

The Manuring of Tea.

By GEORGE A. COWIE, M.A., B.Sc.

(Continued from Page 413.)

PHOSPHATIC MANURES.

Of the three plant foods, nitrogen, potash and phosphoric acid, the latter is removed in the least amount by the tea leaves. Its importance, however, must not for this reason be in the least minimised, for this constituent is likewise indispensable to the plant, and it is impossible to grow the best crops unless it is available in the soil in sufficient amount. As in the case of potash, the exact function of phosphoric acid in the plant economy is rather obscure. It is known, however, that it supplies a necessary element for the formation of that complex substance, protoplasm, from which all plant growth proceeds, and of the nuclei of the cells, which are largely composed of phosphatic compounds. It has also been proved satisfactorily that a certain relation exists between the formation of the proteid compounds in the plant, and the presence of phosphoric acid. The albuminoids are rendered sufficiently soluble by the phosphoric acid to enable them to be transferred from one part of the plant to another.

Originally phosphoric acid was supplied in the form of crushed bones, but the action of these was found to be extremely slow. The German chemist, Baron Liebig, however, found that by dissolving the bones in sulphuric acid the availability of the phosphate was greatly increased, and that the product, known as vitriolated bones, was considerably quicker in its action than the raw, untreated material. The consequence was that this manure became soon a favourite source of phosphoric acid. The supply of bones, however, was not equal to the demand, and other sources of phosphoric acid had to be found, when mineral phosphates came to the aid. These phosphates usually contain phosphoric acid in the form of insoluble tricalcic phosphate of lime, and are not easily available to the plant. When treated with sulphuric acid, however, the phosphate is converted into a form that is much more quickly assimilated, and in this condition these manures are much more generally used under the name of superphosphate.

SUPERPHOSPHATE.

This source of soluble phosphoric acid frequently forms one of the main ingredients of several manure mixtures, and where immediate returns are looked for it is the most available form of phosphate that can

be used. Before applying this manure, however, the nature of the soil must be taken into consideration. If it is applied to a soil that is rich in the hydrated oxides of iron and alumina, there is always the danger that the soluble phosphate in the manure will be rendered insoluble by combination with those compounds before the tea bush can make use of it. Its application to soils deficient in lime is likewise not to be recommended, as the manure is possessed of a strong acid reaction, and its effect would be to neutralise the bases that are necessary and at the same time so beneficial to the soil.

BASIC SLAG.

Another important source of phosphoric acid is basic slag or Thomas' phosphate. It is a residual material obtained as a bye-product in the manufacture of steel from pig-iron containing phosphates. Basic slag contains generally from 10 to 20 per cent. of free lime, and is, on this account, to be recommended specially for use on soils deficient in this particular constituent. The phosphate contained in it is also in a more readily available form than in the ordinary ground mineral phosphates. It contains as a rule 17 to 19 per cent. of phosphoric acid.

CRUSHED BONES.

The phosphoric acid in crushed bones is in an entirely insoluble condition, and consequently the action of this manure is too slow to meet the requirements of a plant like the tea, that has to be continually and rapidly forming new growth. To render raw bones a suitable manure for the tea crop, treatment with sulphuric acid is first necessary in order to convert the phosphate into a form that could be quickly assimilated by the plants. The same reasons can be urged against the use of raw material phosphates for the fertilisation of tea.

LIME.

Lime is also necessary for plant development, and is present in every part of the plant, especially in the stems and older leaves. Calcium serves the plant directly and also indirectly. Directly, it assists in the formation of the cell walls of the plant, and is connected in some way with the formation and transference of some of the carbohydrate bodies in the leaf, which help to give fulness to the liquor. Indirectly, it promotes the nitrification in the soil by neutralising the nitric acid formed as the result of this important process. Besides, lime acts beneficially by setting free in the soil a large quantity of residual food, by neutralising the humic acids produced by the decay of vegetable matter, and thereby maintaining the soil in a neutral condition. Its application to clay soils is followed by very beneficial results, inasmuch as it renders the texture of the soil less tenacious, and liberates large quantities of plant food, especially potash. Its effect on soils which contain an excess of

organic matter is to decompose the vegetable matter and render its inert nitrogen available to the plant.

It is also important to note that soils destitute of lime retain very little potash or ammonia, when these are supplied as salts of powerful acids, as, for instance, chlorides, nitrates, or sulphates. When carbonate of calcium is present, the potassium or ammonium salt is decomposed, and the base is retained by the soil whilst the acid, united with calcium, escapes into the drainage water. The addition of lime may thus greatly increase the retentive power of a soil for bases.

Regarding the use of lime for tea Mr. Bamber says: "There has been and still is a distinct prejudice against the use of lime for tea, no doubt arising from the fact that tea as a rule will not grow luxuriantly in Ceylon, when as much as 1 per cent. of lime exists in the soil. Up to .4 or .5 per cent., however, tea does excellently, and even where the lime amount to .7 per cent., or 1.33 per cent. of carbonate of lime, as shown by Mr. Hughes' analyses of some of the Udupussellawa soils (Liddesdale), it yields tea of high quality.

When we consider that about 10 per cent. of the ash of tea leaves and about 15 per cent. of the ash of the lighter prunings is lime, and that the proportion of this constituent dispersed through the substance of the leaves and plant is fairly constant, the absolute necessity of a supply of available lime in the soil is evident. Tea soils at no time contained a large proportion of this constituent, and as it is the base chiefly removed by drainage water, its replacement in some form or other is imperative.

} From the fact also that excess of lime checks or prevents growth entirely, it is probable that a smaller proportion in the soil tends to check a rapid flush, and in this way assists in improving the flavour by affording the leaf a longer period of growth before it is plucked.

It has been recommended to bury lime with prunings at the rate of 3 to 6 cwts. per acre, so as to hasten decomposition and the destruction of fungoid growths, or to apply it at the rate of 2 to 3 cwts. per acre by dusting over the stems of the bushes immediately after pruning to destroy moss and lichenous structures. When the stems are moist with dew and rain, the lime rapidly acts upon and kills the moss and lichen, which dry and shrivel up and ultimately fall off, leaving the stems perfectly clean. The results obtained from this latter manner of application of lime have been very successful, the bushes being far cleaner and the growth more healthy and vigorous.

APPLICATION OF MANURES.

In the application of manures it is important to observe that the quantity applied to each tree is the same, and that the manure is well mixed with the soil and not left exposed on the surface of the ground.

For the first round of manuring it is generally advisable to apply the manure over a space equal in area to about 1 ft. to 1½ ft. square above each tea bush. This may be carried out as follows:—

A very slight depression or hole being made in the ground of the requisite area, say 1½ to 2 in. deep by 1 ft. square, near each tea bush, the manure should be sprinkled therein and thoroughly forked over and mixed with the lower soil. The surface soil should then be replaced on top of the hole. This manure will thus be well covered up and preserved from loss. The manure, however, may simply be forked into the ground over a similar area if a cheaper method of application is necessary.

The object of applying manure to only a small portion of the ground at the first application is to enable the tea to absorb the entire quantity applied, as the lateral root growth between the lines is often deficient when manuring is started. The result of this has been found in practice to be decidedly superior to broadcasting the manure over the surface of the ground.

For the second round of manuring, the mixture, after being weighed out to each tree in the requisite quantity, may be scattered by the coolies' feet over the soil between the tea lines, and all the surface soil between the lines then thoroughly, but not too deeply, forked over, avoiding injury to the main lateral roots of the tea.

On very steep land the manure is best applied above each tree by means of alavangoes, care being taken to thoroughly mix the manure with the soil.

It is of great importance to note that on no account must the manures be heaped round the collar of the plant—the feeding roots are not to be found there. Instances have been known where tea bushes were actually killed by applying a large quantity of active manure close round the stems of the bushes. The fermentation of the manure caused the bark to rot, and as soon as the ring had extended right round the stem the continuity of the upward conducting tissues of the tea plant was destroyed, and the death of the plant speedily followed.

The time of the application of the manures should, if possible, be when the rainfall is comparatively short, being not too much to wash the manures out of the ground, but just enough to carry them to the roots of the plants. The manuring should take place a little before pruning, so that the new roots may obtain the full benefit of the manure. By this means a good foundation of a bush will be obtained and the wood for future pruning will be much healthier and stronger.

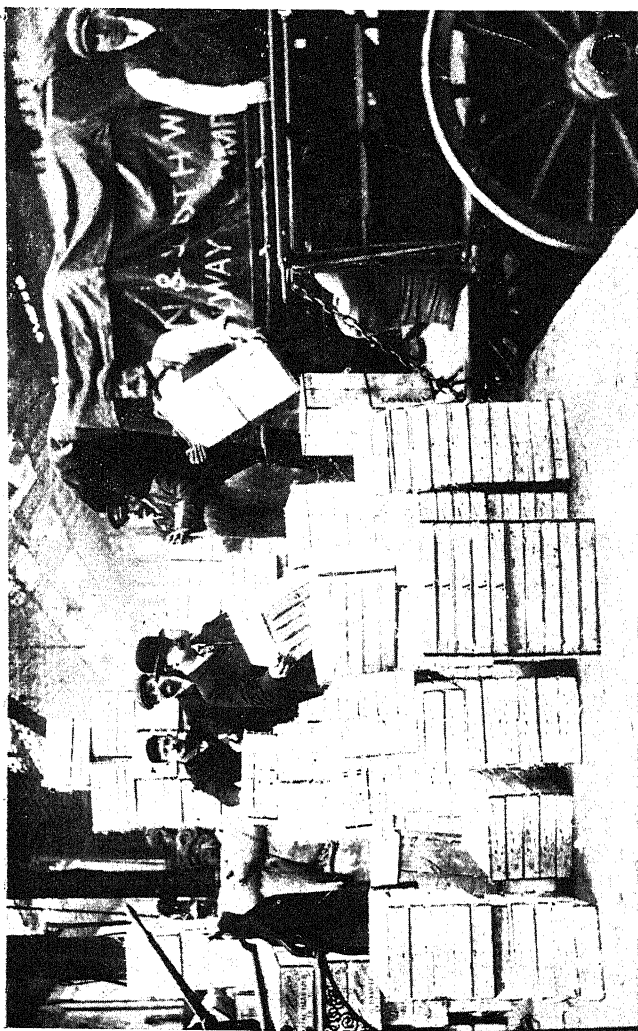
With respect to the general relationship of manuring to quality, Dr. Mann states in his book, "The Factors which determine the Quality of Tea":—

"When we consider that in our experiments at Huleaka the repeated small dressings also gave a better result in point of yield, and that

this was the case with cattle manure, rape or mustard cake, and castor cake, the best method of manuring seems perfectly clear, whether one considers crop or quality. I am, in fact, inclined to imagine that the evil reputation attached to manuring from a quality point of view is almost entirely due to the application of too much manure at one time. From what we can see at present it seems (except perhaps in some very exceptional cases) that better results are obtained by putting 6 2-3rd tons of cattle manure per acre on to land in each of three successive years than by putting 20 tons on at the same time; that the same advantage is noticed in using five muids of any class of oil-cake per acre in each of three successive years, as against putting on fifteen muids all at once. It is most likely the same would be the case with artificial manures like nitrate of soda, saltpetre, and sulphate of ammonia, though definite data are not in my hands at present."

The *Queensland Agricultural Journal* describes a new cane-reaping machine which has been invented by Mr. W. J. Howcroft, of Brisbane, and patented in most sugar-growing countries. Like an ordinary corn reaper the Howcroft machine runs outside the standing crop, and the motor power sets in action a series of blades which are termed "feelers" or "fingers," and which, when not in use, can be raised to a height of 18 inches above the ground. When working, the "fingers" are lowered, and seize the canes for the purpose of holding them steady against the action of the knives, which are arranged immediately below, and rotate on a lever at a speed of some 400 revolutions per minute. It is claimed on behalf of the machine that by its means the canes can be cut an inch or more below the surface of the ground, a most important point as every cane-grower knows. As soon as the canes are reaped by this machine, they pass on to a movable platform, where they are automatically arranged, and come under the action of a second series of knives, by which the tops of the canes are removed.

The machine is worked by two small oil motors, and, it is asserted, is capable of cutting 150 tons of cane per day, which means that an area of 50 acres, with 20 tons of cane to the acre, would be reaped in seven days. Such an achievement would be of infinite benefit to the sugar industry of Queensland, a colony in which the labour difficulty is at present severely felt.



NATAL FRUIT IN LONDON.—III.

Loading Natal Citrus Fruit into vans at Nine Elms Station.

Feeding Live Stock.

NOTES ON THE RESULTS OF SOME RECENT EXPERIMENTS.

(Continued from page 290.)

IV.—CATTLE-FEEDING EXPERIMENTS.

THE results of feeding experiments at Cockle Park (held under the direction of the Education Committee of the County of Northumberland, England, from the years 1904 to 1908) have been published under the hand of Professor D. A. Gilchrist. The report is summed up in an interesting manner by the *Live Stock Journal* in a recent issue.

Twelve cattle, under two years old, were fed in four boxes, three in each box, and they were divided into two lots of six in each lot. All the cattle were blue-grey, and were calves bred from a white Shorthorn bull and Galloway cows, in season 1906 at Cockle Park. Each lot of six consisted of three heifers in one box and three bullocks in another box. The cattle were on the average just over eighteen months old when the experiments commenced, and were in good store condition.

For the preliminary month's feeding the daily ration fed to each beast was as follows:—

LOT 1.	LOT 2.	
56 lb. swedes.	28 lb. swedes.	
14 „ meadow hay.	2½ „ meadow hay.	} in place of 28 lb. swedes.
*3 „ cake and meal.	2 „ maize.	
	14 „ hay.	
	*3 „ cake and meal.	

* This consisted of two parts Indian cotton cake, one part decorticated cotton cake, half-part linseed cake, and one part maize meal.

The feeding for the first experimental month was the same as the foregoing, except that the cake and meal for each lot was increased to 4 lb. per head daily. The feeding for the second experimental month was the same as for the previous month. The feeding for the third experimental month was the same as for the previous month, but the cake and meal for each lot was increased to 5 lb. per head daily. The feeding for the fourth experimental month was the same as for the previous month.

So far as Lot 1 was concerned, the total gain in fasted live weight per beast, during the four months' experiment, was 1 cwt. 2 qr. 14 lb., and in Lot 2, 1 cwt. 3 qr. 21 lb. The average increase in value per beast in Lot 1 was £5 12s. 5d., and in Lot 2, £6 3s. 5d. The cost of food during the four months was for Lot 1, £4 2s. 7d., and for Lot 2, £4 13s. 2d., leaving a gain, less other expenses, of £1 9s. 13d. on Lot 1, and £1 10s. 3d. on Lot 2.

The cattle were sold fat at the end of the experiments and realised on the average 37s. 2½d. per cwt. live weight. They were valued at the

beginning of the experiments, and from this it has been calculated that their value per cwt. live weight at this time was 31s. per cwt. In the first experimental month slightly better gains were made by Lot 1 than by Lot 2, but in the later periods Lot 2 had on the average distinctly the advantage. A final result was that the increase in value per beast, during the experiments, was 11s. greater on the average of the cattle of Lot 2 than of those of Lot 1. The swedes were valued at 6s. 8d. a ton, and the cost of the hay and maize substituted for the swedes was equal to 14s. 2d. per ton of swedes. The hay was valued at 50s. per ton, and the maize at 136s. 6d. per ton. The net result was that the gain per head was only 5d. greater from the cattle of Lot 2 than from those of Lot 1.

Maize meal (2 lb.) and meadow hay (2½ lb.) were substituted for 28 lb. swedes. These contained the following percentages of dry matter:—Maize meal, 86.53; meadow hay, 88.66; and swedes, 11.51. The percentages of the dry matter digestible in each of these were:—Maize meal, 89.5; meadow hay, 67; and swedes, 90. Therefore:—

28 lb. swedes	contained 3.22 lb. dry matter (2.898 lb. digestible).
2 „ maize meal	(contained 3.95 lb. dry matter (3.033 lb. digestible).
2½ „ meadow hay	

The maize and meadow hay substituted for the swedes therefore (from the actual analysis) contained rather more feeding constituents than the swedes.

The nutritive ratio of the substituted foods was also higher (1 : 7.5) than that of the swedes (1 : 14). As the substituted foods were slightly richer than the swedes, this probably explains why the former has given slightly the best feeding results.

Points indicated by the experiments are:—

(1) That a comparatively small ration of roots may be fed to fattening cattle and that a substitute for the remainder of a full ration of roots, consisting of foods like a combination of meadow hay and maize meal, may quite satisfactorily take the place of a full daily ration of swedes fed to fattening stock during the winter.

(2) That hay in its long condition and dry meal can quite as satisfactorily take the place of half the rations of roots, as when the hay is chaffed, the meal mixed with it, and the whole moistened with treacle water.

There is much to be learned from these most recent feeding experiments. The teaching from Cockle Park is to the effect that when the ration of roots has of necessity to be decreased the deficiency can be made up at the least cost and trouble, and with the greatest chance of a profit, by increasing the ration of dry food; for example, by giving more hay and maize meal. The cost is, of course, a little more, but the daily gain of the fattening bullocks is the same. The following daily

ration is suggested for big feeding bullocks of over 100 stones live weight:—

66 lb. swedes, or 88 lb. yellow turnips.
 2 lb. undecorticated cotton cake.
 3 lb. decorticated cotton cake.
 4 lb. maize meal.
 12 lb. meadow hay.

If roots are scarce, and have to be reduced by one-half, the deficiency could be made up by adding a further $2\frac{1}{2}$ lb. maize meal and 4 lb. of oat straw. If the bullocks were smaller, say from 75 to 80 stone live weight, as many are, three-fourths of the above quantity would be sufficient. If in the case of big bullocks it was expedient to give more hay and less meal along with the full ration of roots, this could be done by reducing the 4 lb. of maize meal to 1 lb., and increasing the 12 lb. of meadow hay to 17 lb. If it was found desirable to substitute oat straw for meadow hay, a good ration would be 66 lb. swedes, $4\frac{1}{2}$ lb. decorticated cotton cake, $2\frac{3}{4}$ lb. undecorticated cotton cake, 1 lb. maize meal, and 17 lb. oat straw. These rations have been set out at length because a modification of them, according to the feeding stuffs available, will suit any farmer; with a reliable foundation to start from he can modify to suit his environments and still be certain of satisfactory results.

In reporting the experiments, the fact is emphasised that feeding stuffs, especially hay and oat straw, as well as roots, vary very much indeed in feeding value. Meadow hay may be rich and good, full of clovers and nutritious herbage, in which case less would suffice; it may also be dry, hard, and of very poor quality, and if so it is worse than medium oat straw. Oat straw, too, varies in much the same way. If cut before fully ripe and well harvested it is much superior to dry, weathered straw. If any food is mouldy or damaged its feeding value is greatly decreased.

As a correspondent in the *Darlington Chronicle* points out, the feeding value of roots varies to an equal degree, so there is plenty of room for a man to exercise intelligent judgment when preparing a cattle ration, even when he has an idea of the quantities to give.

Many hints are given as to the value of feeding stuffs. Seed hay, contrary to general opinion, is only of slightly higher value for cattle feeding than meadow hay, $4\frac{1}{2}$ lb. of the former being considered equal to 5 lb. of the latter. Here, again, is another very useful fact for feeders. 5 lb. of meadow hay of average quality is equal in value for feeding purposes to 3 lb. of maize meal. As maize costs now about £7 per ton, and meadow hay has been sold as low as £2 per ton in the stack, it is much more profitable to use the latter than to sell it for the purpose of buying maize. Barley, oats and wheat are about equal to maize. Beans and peas have a high feeding value; 2 lb. of either may be substituted for 3 lb. of ordinary cotton cake, and equal results obtained.

V.—EXPERIMENTS IN PIG-FEEDING.

PIG-FEEDING EXPERIMENTS. By F. B. Linfield. (Bulletin No. 73, Montana Agricultural Experiment Station.)

Mr. F. B. Linfield records the results of a series of experiments carried on by him from the autumn of 1905 to the autumn of 1907. During this time some eight experiments were conducted and ninety-four hogs fed. The main object of the tests was the study of a variety of supplemental foods in the economic fattening of hogs.

The hogs were fed twice a day, morning and evening, and, except as otherwise stated, were given all they would eat of the ration. The grain was fed wet. When skim milk was fed it was mixed with the grain, and when grain was fed alone it was mixed with water to give nearly like conditions as with the skim milk. The roots were fed either cut or pulped, and the clover or lucerne, except in one experiment, was fed in a little rack in the open. The grain, etc., was weighed at each time fed, and the hogs weighed three days in succession at beginning of the test and each two weeks thereafter till close of test, when they were again weighed three days in succession.

The first experiment of the series was started in the fall of 1905. There were four pigs in each lot, and they were about five months old. They were all grade Berkshire and had been fed enough grain to keep them growing nicely. The hogs were fed from a trough, in small pens, and the test continued for fifty days.

In the second experiment there was fed a small bunch of young hogs, ranging from 31 to 66 pounds. This experiment started the first of December and continued for one month. The hogs were divided into three lots, with five animals in each lot. The purpose of the test was to compare the value of varying amounts of skim milk with the grain ration.

Lot 1 was fed at the rate of one pound of grain to five pounds of skim milk; lot 2 was fed one pound of grain to three pounds of skim milk, and lot 3 was fed one pound of grain to one and one-half pounds of skim milk. The milk and grain were fed mixed together and given to the pigs twice a day. The grain consisted of one part of oats and two parts barley, both being chopped. The experiment continued for 31 days.

The third experiment was continued with the same hogs that were fed in the second experiment, one additional hog being added to the lot. The sixteen hogs were divided into four lots, with four hogs in each. The average weight of the hogs in each lot ranged from 98 to 101 pounds. The experiment continued for 65 days.

The pigs in this experiment were from two litters, one cross-bred Yorkshire-Poland China and the other cross-bred Poland China-Berkshire. They were about 160 days old at the beginning of the test.

The rations fed to each lot were as follows:—To lot 1, peas 3 parts and oats 1 part; lot 2, barley 3 parts and oats 1 part; lot 3, barley 3 parts, oats 1 part, pulped roots being fed at the rate of 1 pound of roots to 3 pounds of grain; lot 4, barley 3 parts and oats 1 part, with cut clover, the clover being fed at the rate of 1 pound to 5 pounds of grain. All of the grain fed was chopped.

The fourth experiment was started on June 4th, 1906, and continued for 80 days. There were 12 hogs in this experiment, divided into four lots. They were fed as follows:—Lot 1 on a mixed grain ration consisting of 4 parts of barley and 1 part of oats; lot 2 was fed on the same mixed grain with skim milk, feeding 1 pound of grain to 3 pounds of skim milk; lot 3 on the same mixed grain, with clover or grass, feeding what grass the hogs would eat; lot 4 was fed on mixed grain and “digester” tankage, feeding 8 pounds of grain to 1 pound of tankage.

These hogs were fed in small pens in the piggery. At the beginning of the test they averaged from 80 to 96 pounds, and they gained from 106 to 144 pounds during the 80 days of the test.

The fifth experiment was started in the latter part of August, 1906, and continued for 72 days. Nine pigs were used in this experiment, and they were divided into three lots. These pigs were high grade Berkshire-Poland China, some of them being about seven and others ten months of age.

They were fed as follows:—Lot 1 was fed in pens on a grain ration, consisting of 4 parts barley and 1 part oats by weight; lot 2 was fed on the same grain ration and was allowed to run on pasture; lot 3 was fed on one-half the grain ration given to lot 2, and was allowed to run on the pasture.

The sixth experiment was started about August 27th, 1906, and continued for 28 days. This was a lot of small pigs, all being Poland Chinas, and about ten to twelve weeks old. They were all fed the same ration, consisting of mixed grain made up of 2 parts peas, 2 parts barley and 1 part oats, fed with skim milk in the proportion of 1 pound of grain to 3 pounds of skim milk.

Experiment No. 7 was continued with the same hogs as experiment No. 6, divided exactly as in the previous experiment. In experiment No. 7, however, different rations were given to the various lots. Lot A was fed a grain ration consisting of 4 parts barley and 1 part oats, together with what sugar beets they would eat. Lot B was fed the same grain ration with skim milk, feeding a proportion of 1 pound of grain to 3 pounds of skim milk. Lot C was fed the same grain ration with tankage, giving 8 pounds of grain to 1 pound of tankage.

Experiment No. 8 was started in November, 1906, and continued for 65 days. The pigs were divided into four lots, three pigs in each lot.

They were fed as follows:—Lot 1 a mixed grain ration consisting of

equal parts of barley, wheat and oats. Lot 2 was fed the same grain ration with skim milk, giving 1 pound of grain to 3 pounds of skim milk. Lot 3 received the same grain ration with sugar beets, giving just what sugar beets they could eat. Lot 4 was fed the same grain ration with clover hay, the hay being fed in a small rack.

THE RESULTS.

Experiments 2 and 6 are illustrations of the economy of feeding young pigs, when they receive the proper ration. In experiment 2, pigs averaging 53 pounds in live weight gained an average of 1.2 pounds per day and put on the 1 pound of gain at a food cost of 1½d. In experiment 6, pigs averaging 40 pounds gained .92 pounds per day, at an average cost of 2d.

Peas make a more efficient hog feed than does barley, but because of the greater cost of the peas the barley makes a more economical ration.

A ration of grain, with skim milk as a supplemented food, when fed to hogs gave:—First, the most rapid gains, and second, the most economical gains, but took second place to tankage as an efficient ration.

A ration of grain with tankage as a supplemented food came second in rate of gain, but first in efficiency of ration. Because of the high cost of the tankage, it makes an expensive ration when fed in the proportions given in these tests.

Roots as a supplemented food also makes a valuable addition to the ration, coming next in value to skim milk and tankage.

Clover or lucerne fed as hogs will eat it, together with a grain ration, improves materially the rapidity of the gain and the economy of the feeding.

In these tests the hogs fed grain alone made economic gains, but the lowest daily gains and on an average the most expensive gains were made on such a ration.

Hogs fed a half grain ration on clover and lucerne pastures made, in proportion to the grain fed, much faster gains and much more economic gains than those fed a full grain ration.

The central thought in these tests is that some supplemental food is necessary in feeding a grain ration to hogs if the most rapid and economic gains are to be had.

VI.—FEEDING EARLY HATCHED PULLETS.

An experiment has recently been carried out by the Cornell University Agricultural Experiment Station with the object of finding out how to feed early hatched pullets in order to secure best results in development, production and profit. While early pullets are generally recognised as the most profitable winter layers, it is commonly supposed that pullets hatched extra early are not so well adapted to this purpose.

It has been thought that these earliest pullets should receive special treatment designed to check the laying tendency during late summer, with the hope of getting larger egg yield in early winter. This treatment is called *retarding*. The pullets, just approaching maturity, are allowed a grass run, and a satisfying ration of whole grain with a limited proportion of beef scrap, but no ground grain.

It is thought by many that if these pullets should be *Forced*—i.e., fed a rich, stimulating mash to induce egg production—they will lay a few small eggs, and molt prematurely, thus greatly reducing their vitality; that, in this case, it would be a long time before they would resume egg production, their bodies would be permanently stunted, and their eggs would continue smaller than is natural to their variety.

This experiment was undertaken with the hope of obtaining results either for or against these theories, and of finding a method of feeding which could be recommended for early hatched pullets.

The experiment was begun with 80 Single Comb White Leghorn pullets, and conducted for a term of 364 days, the time being divided into 13 periods of 28 days each. It was started July 28th, 1906, and closed July 27th, 1907.

The four pens were numbered 1, 2, 3 and 4 respectively, and each contained twenty pullets hatched February 27th, making them five months old.

Some of the pullets were laying (though most were less mature) and all seemed to be healthy. They were so selected that the flocks, as nearly as possible, were equal in weight, vigour and maturity, and their surroundings were practically alike. No males were put in the pens till December 1st, 1906.

The pens were all in one house, and were separated from each other by wire partitions. Each had a floor space of 86 square feet, or 4.3 square feet per hen. The house had 13.2 square feet glass surface, and 10 square feet of cloth surface. The entire air space was about 2,350 cubic feet, or 29.3 cubic feet per hen. Except on extremely cold days, the cloth windows were removed in the morning, the openings being covered only by wire netting.

There being only two yards available for the four pens, the hens were alternately allowed a grass run until November 20th, 1906. From that time until March 20th, 1907, they were confined in the pens; but from the latter date they were alternated as before until the close of the experiment.

The pullets were weighed at the beginning of each period of 28 days, and also at the end of the experiment. From August 1st, 1906, to March 1st, 1907, and from July 1st to July 27th, 1907, they were inspected individually each week as to their condition of moult. Between March 1st and July 1st they were examined only once each period

of 28 days, at the time of weighing. To make sure that the mould was correctly observed, the pullets were dipped in Diamond dyes at the beginning of the moulting observations, thus making any new white feathers distinctly visible.

The hens were trap nested during the entire time, and individual records kept. The eggs were weighed for six consecutive periods, and after that for a week at a time at intervals of two months, until the close of the experiment. Eggs from each pen were incubated, and records kept of the results.

Pen I.—*Forced*—received the grain mixture morning and night in the litter and wet mash at noon.

Pen II.—*Forced*—received the grain mixture morning and night in the litter and dry mash in a hopper open at all times.

Pen III.—*Retarded*—received grain morning, noon and night in litter, and beef scrap once a day in a trough.

Pen IV.—*Retarded*—received grain mixture and beef scrap in a hopper open at all times.

The pullets in all four pens had grit, oyster shell, and water always before them, and were given mangel beets and green cut bone at intervals during the period of close confinement.

In this experiment it was found forced pullets made a better profit than retarded pullets: Ate less food per hen at less cost per hen than retarded pullets; produced more eggs of a larger size, at less cost per dozen than retarded pullets; produced more eggs during early winter than retarded pullets; gave better hatching results of eggs than retarded pullets; made a greater percentage of gain in weight than retarded pullets; showed less broodiness than retarded pullets; had less mortality than retarded pullets; showed better vigour than retarded pullets; and showed the first mature moult earlier than retarded pullets.

Retarded pullets gave better fertility of eggs than forced pullets.

Hopper-fed dry mash gave better results in gain of weight, production of eggs, gain in weight of eggs, hatching power of eggs, days lost in moulting, mortality, health and profit per pen, than wet mash.

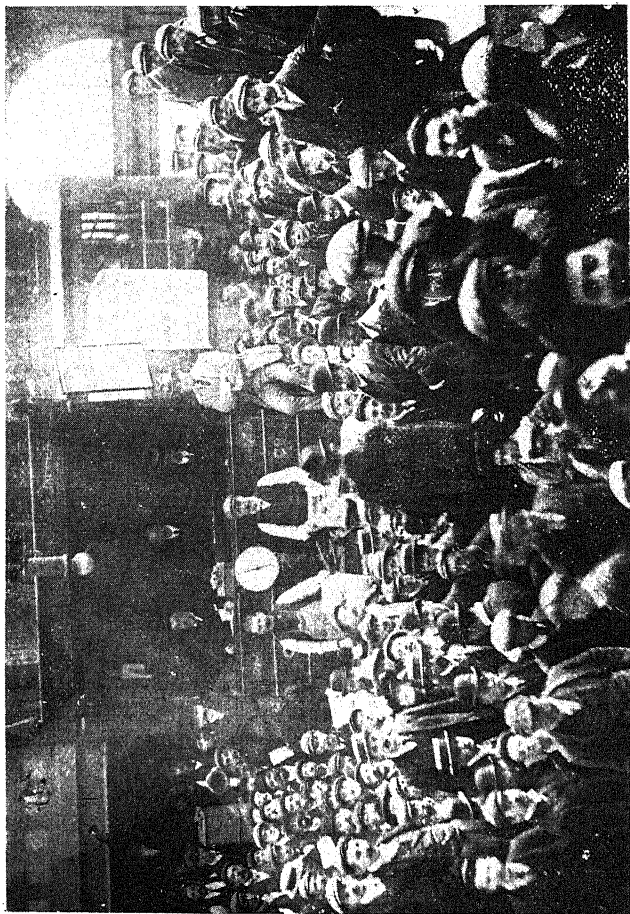
Wet mash and grain fed pullets consumed slightly less food at less cost, and produced eggs at slightly less cost per dozen than dry mash and grain fed pullets; and produced slightly larger eggs of slightly better fertility, and showed less broodiness than dry mash and grain fed pullets.

Dry mash and grain fed pullets laid eggs of good size at an earlier period than wet mash and grain fed pullets.

Hopper-fed pullets ate more than hand-fed pullets.

Pullets having whole grain ate more grit and shell than those having a proportion of ground grain.

Pullets fed on grain were more inclined to develop bad habits than those having a mash.



NATAL FRUIT IN LONDON.—IV.
Scene at the Auctioneer's Stand, Covent Garden.

Earliest producers did not give as many eggs in early winter.

Early layers gained as rapidly in weight as those beginning later to lay.

Prolificacy made but slight difference in weight of hen and weight of egg.

The most prolific pullets did not always lay earliest.

Pullets did not as a rule lay while moulting.

Does Poultry-Keeping Pay?

AN INTERESTING COMPETITION.

"Is Poultry Keeping in South Africa a Payable Proposition?" Such was the question asked by the *South African Poultry Journal* (Durban) in its issue of the 19th February; and, with a view to obtaining definite information, offered prizes for the best article on certain stipulated lines sent in before the 31st March. Only one letter was received on the subject—and that one does not fulfil the main condition, *viz.*, the giving of a year's experience—but the letter received is of such an interesting character, and so full of encouragement to "back-yard" fanciers, that the second prize was awarded to the sender, Mrs. N. Dent. Mrs. N. Dent writes as follows:—

"DEAR SIR,—Does poultry pay?—Well, I think it does, if one will take an intelligent interest in their birds. Last June I purchased a White Leghorn cockerel, prize bred, cost £1, and four utility White Leghorn hens at 15s. each—total, £4. From this pen of birds all the eggs laid, with the exception of those used in the house, were incubator hatched, and sold as early as possible. I made £8 from the chicks, but I kept no record of expenditure for food until I saw your question in the *South African Poultry Journal* of February 19th.

"Now, I am sending you a balance-sheet, and I hope it will be the means of encouraging others to take up what is, to me, a very interesting and payable hobby. I have only a back yard, bare earth, 30 ft. by 15 ft., but I bring in a barrow-load of road sand occasionally, which keeps it nice and gravelly. The house, 10 ft. by 6 ft., is built of wood and iron, and the cost was 25s. My poultry consists of the pen of Leghorns mentioned above, and five August-hatched pullets. I feed on soft food mornings, which consists of meat scraps and vegetables, parings, etc., as nothing is wasted. It is thoroughly cooked and mixed into a crumbly

state with pollard and bran. At mid-day I hang up a cabbage, which keeps them busy for a couple of hours, and at five o'clock I give them a good feed of wheat. Twice weekly I give green cut bone. The yard and house is swept and cleaned up daily.

"I purchase all food and medicines from Mr. J. F. Marshall, and therefore could send all invoices and market notes, if necessary. I have also a good pen of October hatched White Orpingtons. If you find this interesting I will send another statement in June. With best wishes for the success of the paper.—Yours faithfully,

N. DENT.

Cycle Depot, Ophirton.

Mrs. Dent's balance-sheet is as follows:—

BALANCE SHEET.

EXPENDITURE.				REVENUE.			
January 1st to March 31st—				January—			
Wheat	...	...	0 10 0	3 Hens, with Broods of			
Pollard	...	...	0 5 0	Chicks, at 22s each	...	3 6 0	
Bran	...	...	0 5 0				
Cut Green Bone, about	...	...	0 6 0	February—			
Vegetables, Roup Powder,				4½ dozen Eggs sold for	...	0 15 3	
and Epsom Salts, about							
3 Broody Hens, bought as				March—			
required	...	...	0 12 0	7½ dozen Eggs sold for	...	1 12 3	
Profit	...	...	3 5 6				
			<u>£5 13 6</u>			<u>£5 13 6</u>	

Feeling that it may start others keeping accounts, the *Poultry Journal* has decided to have a new competition, ending 31st December, 1909, on much the same lines and for the same prizes as those published in its issue of the 19th February. This may lead to further interesting results.

Mature pigs that are thin may be made to gain half a pound per day on lucerne without grain.

We have received from Messrs. C. E. Gardner & Co., Ltd., Union Street, East London, a copy of a comprehensive catalogue of veterinary instruments, appliances and medicines, which we believe to be the first of its kind issued in South Africa. It should prove of considerable use to the stock-owner in this country, and Messrs. Gardner & Co. will be glad to send a copy post free to any farmer wishing to obtain one.

India-Rubber and its Production.

(Continued from Page 319.)

IV.—ASSAM RUBBER.

(*Ficus elastica*.)

ASSAM rubber is derived almost entirely from *Ficus elastica*. This tree grows wild along the foot and along the low tropical valleys of the Himalayas, and in the valleys of the southern mountains of the Brahma-putra Valley.

According to Spon's Encyclopædia, the natives who tap the wild trees slash every part of them within reach with their *daos* or knives. The incisions on the lower part of the stem, and on the roots, which run some 30—40 ft. on the ground, are 6—18 in. long, and are made diagonally through the bark and into the wood, in a elliptical form, measuring about 3 in. across the centre. The exudation from these wounds is received in holes dug in the earth, or in leaves folded conically; that from the smaller cuts on the upper branches is allowed to concrete on the spot. According to Collins, the yield of a tree in August is about 50 oz. of milk, giving $15\frac{1}{2}$ oz. of rubber; sometimes the proportion of rubber falls so low as 10 per cent. He also observes that "during the cold season, October—March, the milk is scantier, but richer than in the warm weather, March—October." Mann finds the best tapping season in Assam to be February—April. Hunter states that the trees "yield most during the rains"; he adds that a high yield for the first tapping of a tree 18 in. 6 ft. in girth is 35—40 lb. of rubber, it is then allowed 3—4 years' rest, when a second but much smaller collection is made. Markham asserts that the trees may be tapped at 25 years, and that after 50 years they will yield 40 lb. of rubber every third year. Morton says that in the Malay Peninsula the milk is obtained from the large roots, which are tapped 10—12 times in a year; a *picul* (133 1-3rd lb.) is sometimes taken from a large tree, but the usual yield is about $\frac{1}{2}$ *picul*. This kind is said to require no preparation for market, and to present the appearance of long strings irregularly welded together, the best quality being the gummy-looking, of very firm texture, and reddish-brown colour, while the inferior qualities have a large admixture of bark and are much drier, without gum-like consistence of the bitter grades. In Assam, on the other hand, it is the "loaf" rubber obtained from the lower parts of the stem and roots that requires artificial preparation, while none is bestowed upon the produce of the smaller branches. The treatment consists of pouring the milk into boiling water and stirring

until it assumes sufficient consistence to admit of being handled without becoming clammy or sticky. The plan adopted by the European house at Texpore is to run the milk into wooden bins 6 ft. square, partially filled with water, on which the rubber floats after a time. The latter, while still liquid, is removed and boiled over a slow fire in iron pans 4—6 ft. in diameter and 2—2½ ft. deep, two parts of water added, and the whole stirred constantly. When coagulated, the rubber is removed with iron forks, pressed, again boiled and pressed, sun-dried and washed over with lime.

The rapid destruction by the natives of the wild trees in Assam has called forth efforts to establish their cultivation in regular plantations. That at Chardwar has an area of 80 square miles, some 700 acres being under cultivation already. In 1878, it was stated that the planting had scarcely emerged from the experiment stage, for though no doubt remained that the tree would grow luxuriantly in the locality chosen, there was much variation in the degree of success gained by the several methods of planting. The plants put out in cane baskets in the forks of trees, though alive and healthy, remained nearly stationary, and many of those simply planted in the ground did badly, thus condemning these two plans. All those planted on low, split stumps in earthenware cylinders on low stumps of trees, on piles of wood put crossways and mixed with earth, and on small mounds of earth 2—3 ft. high, did remarkably well, drainage about the roots being ensured by these modes. It has been proved that the best cuttings do not transplant so well as seedlings, and that raising plants from seed will be the method of propagation to be chiefly depended on.

Assam rubber has a peculiar mottled appearance, and varies in colour from cream or flesh tints to bright pink or reddish; it is very glossy, and sometimes covered with a greyish-white film, which may arise from oxidation or from some foreign application. Its form is either that of irregular lumps ("slab" or "loaf") produced as already described, or "balls" of the unprepared stringy substance obtained from the smaller branches. The impurities (bark, sand, clay) often reach 35 per cent., especially in the "balls." It arrives in baskets made of split rattan, covered with gunny-sacking, and weighing about 3 cwt. each.

■ In the *Rhodesian Agricultural Journal* for February, 1909, Mr. C. E. F. Allen states that *Ficus elastica* is being tried, with promising results, in the centre parts of Rhodesia. He writes:—

"This plant has made excellent growth in low-lying parts of Rhodesia. At Victoria Falls it showed every sign of being at home, and it probably will be found in the future to be one of the rubber-producing trees for this country, in those parts with an altitude of 3,000 feet and under.

"In a report of this rubber recently sent to London from Assam,

it was valued at from 4s. 3d. to 4s. 6d. per lb. The report says (*Tropical Agriculturist*, September, 1908):—"The percentage of resin is higher than is desirable, but it is of satisfactory quality and would be readily saleable."

"The plant can be raised from seed, and this is the best way to start a supply; it is often increased by cuttings when a plantation has been established. It yields rubber in about ten years and continues producing for many years.

"Like many species of this genus, *F. elastica* sends out aerial roots from the upper branches, which in some plantations are carefully nursed until they take root in the ground, and eventually thicken, so adding considerably to the output of rubber.

"I would recommend those who are interested in the possibilities of this country as a rubber producer to plant some of these trees. A specimen in the garden is at anyrate a small experiment and will help to demonstrate the worth of the tree."

The Deputy Conservator of Forests, Darrang Division, Assam, gives the following cultural directions in his report for 1896-97, based upon Assam experience:—

Picking Out.—When the seedlings are one to two inches high in the seed beds or boxes, they should be transplanted into nursery beds, and put out in lines about a foot from each other. The nursery beds should be well raised and drained, but the soil need not be so carefully prepared as for the seed beds. Here the plants are kept till the following rains, when they are dug up and taken to stockaded nurseries in the forest, and put out 5 x 5 feet on raised, well-drained beds, where they remain for two years till they are required for planting operations.

Planting Operations.—In artificial planting it is found that the rubber grows best on mounds. Lines are cut through the forest 20 feet wide and 70 feet apart from centre to centre; in these lines 15 feet stakes are put up 35 feet apart. Round each stake a mound is thrown up four feet high. The base of the mound is about ten feet in diameter and they taper to four feet on the top; on this mound the rubber tree is planted, care being taken that the roots are carefully spread out before they are covered up with the earth. To prevent animals pulling the plants and wind blowing them down, they are tied to stakes.

Cuttings.—The rubber tree can readily be propagated from the cuttings, if only perfectly ripe young branches or shoots are used, but the tree raised from cuttings does not appear to throw any aerial roots, and, as the future yield of the tree depends on its aerial root system, it is questionable whether trees raised from cuttings ought to be used except where required only as shade givers, such as from an avenue.

General.—The rubber grows equally well on high land or low land, in forest land or grass land, so long as it is planted on a mound and

its roots are not exposed to the sun. It is a surface feeder, but, as soon as its roots appear above the ground, they must be covered with fresh earth until such time as the tree has formed a sufficient leaf canopy to protect itself.

V.—WEST AFRICAN RUBBER.

(*Kickxia Africana*.)

Kickxia Africana is a rubber-yielding tree native to West Africa, which has come to the fore of late years as a rubber producer. The following particulars relating to it are given by a 'correspondent of *Commercial Intelligence* to his paper:—

"The *Kickxia* thrives best in a sandy clay, with a subsoil of clay. I have seen it flourishing in stiff clay, but with feeders only partially buried. Of course, under the latter condition the damp, dark shade of the bush is a necessity. In quite a number of clearings in West Africa I have seen it growing luxuriantly as a sapling in loose, friable, sandy loam, although I must admit it had a tendency to be rather branchy, remediable, however, by judicious pruning. I should say the ideal soil for a plantation would be a loose, sandy clay, with more sand than clay, and a subsoil of clay, so that during the warm, dry season the latter would act as a reservoir, supplying requisite moisture by capillary attraction.

In the bush, the growing saplings sheds its primaries till it practically overtops the closely surrounding forest growth, 70 and often 80 feet from its base. At this elevation I have seen quite a number of trees throw out their gigantic arms. Nature, more by surroundings than by heredity, if I may say so, seems to prune it in the bush in her own incomparable way to ensure a splendid trunk surface for tapping. When it grows in the open, artificial pruning becomes necessary. As the desideratum is to have a good trunk height or tapable surface, unnecessary primaries should be pruned away close to the stem, leaving a sufficient number with concomitant leafage to form new wood. The *Kickxia* is also capable of being stumped, even when pretty old. Should the tree be hopelessly irregular, stumping should be resorted to, but only in the rainy season, when its roots, with the assistance of moisture, adequately help in the preservation of old and the formation of new wood. All but the best sucker or shoot should be pruned away, care being taken to tar the exposed wood, to prevent the destructive incursion of the grub or maggot.

Assuming that the tree has reached maturity, systematic tapping is necessary or rather essential to get a reliable annual supply of rubber; the best way to do this is to make a longitudinal conducting channel up the trunk from the base. It must be recollected that this is only a

conducting channel to capture the milk from oblique, transverse scorings in the bark. The scorings into the bark resembled the letter V, forming angles where they meet the conducting channel of approximately 45 degs. Rectangular scorings would facilitate the milk flowing down the trunk irregularly instead of all into the conducting channel and straight down the trunk into the receptacle placed at the base of the tree to collect the milk for coagulation. It stands to reason that the oblique transverse scorings and conducting channel should be respectively continuous, otherwise there would be a diversion and consequent waste of milk flowing away at the points where they are disjointed. For this reason a *machete*, even in the hands of a skilled European craftsman, would be almost useless, leading to independent cuts and not continuous scorings, considering that the operator must be in an unstable, wobbly position, like Mahomed's mythical coffin. Anyway, he must be above *terra firma* where his *machete* or knife strokes cannot produce continuous and conterminous scorings, but must necessarily be disjointed and fluky. The inner bark should never be cut deeper than a quarter of an inch, as this is amply sufficient to drain away enough milk from the tree and facilitate the healing of the bark, which may be safely accelerated by the application of what I may call, with every apology to the medical profession, an antiseptic plaster, composed of one part of quicklime, two parts of wood-ashes, and five parts clay. This not only excludes the oxygenic, deteriorative action of the atmosphere, but, what is more important, precludes the depredatory entry of the dreaded grub or maggot. If this system be adopted an annual supply is certain, and the conservation of the tree ensured.

Prune a little every year rather than too much in one year. It will be much easier for you and a great deal better for the orchard.

The following amendment of Section 74 of the Regulations under the Coast Fisheries Act, 1906, published under Government Notice No. 17, 1907, has been approved by His Excellency the Governor-in-Council:—The charge provided by Section 74 of Government Notice No. 17, 1907, for fish kraal licenses is hereby reduced from £15 to £7 10d. This reduction shall not be applied retrospectively, but shall be applicable to renewals of existing licenses.

Weenen Phosphates.

REPORT OF ROYAL AGRICULTURAL SOCIETY DELEGATES.

WE have been favoured by the Secretaries of the Royal Agricultural Society of Natal (Messrs. Duff, Eadie & Co.) with a copy of a report made by delegates from the Royal Agricultural Society appointed to enquire into and report upon the use of "Weenen Phosphates" as a fertilising agent on the estate "Brayhill," the property of Mr. P. D. Simmons. We have pleasure in publishing this report herewith:—

The deputation, consisting of Messrs. Jas. King, president of the Royal Agricultural Society; John Moon, vice-president; and Henry Baker, member of committee, met on the 12th April at Mooi River. They were joined by Mr. Fyvie, of the Weenen Agricultural Society.

Conveyances having been kindly provided by Mr. Simmons, the deputation proceeded at once to "Brayhill," which was reached at 1.30 p.m.

After lunch they went to view the crops which had been treated with "Weenen Phosphates." On the way to the mealie field, 16 acres in extent, which was the principal crop to be viewed, an opportunity was afforded of going over some excellent pasture laid down in clovers and English grasses, the uniform thickness and vigorous growth of which was much admired. A little further on a piece of rye-grass was inspected, part of which had been treated with lime, part with superphosphate, and the remainder with Weenen phosphate. The first mentioned was very poor, the second fairly good, the part treated with the Weenen phosphates excellent, some of it fully 18 inches in length, the quantities of fertiliser being identical, *viz.*, about 4 cwt. to the acre.

From here the deputation went to the 16-acre field of mealies, and went right across it about 40 or 50 yards from the end, Mr. Simmons joining us on the further side. In going across the field the lines dividing the parts variously treated were quite easily distinguished by the height and quality of the crop—all of which was duly noted. These consisted of six different strips all differently treated, and it is right to note at this point the whole field was under millet last year and no fertiliser of any kind applied. The quality of the soil seemed rather poor, and in fact is the ordinary light brownish-red soil, which is so common in the middle uplands of Natal.

The remarks on the different samples will be made in the order they came, and the treatments are all mechanically applied excepting the barn-yard manure and are calculated at per acre.

- 1st. 2 cwt. of lime, good dressing of barn-yard manure, and 2 cwt. "Weenen Phosphates." Quality of the crop very good.
- 2nd. Lime 2 cwt., "Weenen Phosphates" 4 cwt. Quality fair, but not as good as No. 1.
- 3rd. Lime 2 cwt., 20 tons barn-yard manure. Quality similar to No. 2.
- 4th. Basic slag, 2 cwt. Quality rather good. Stalk, leaves blighted and poorly cobbled. This mealie is a different kind from the first two, viz., "Golden King," Nos. 1 and 2 being a hybrid apparently from "Horse Tooth," but much earlier in its habit.
- 5th. 4 cwt. "High Grade Phosphate." Quality only fit for fodder, mostly under 4 feet in height.
- 6th. 4 cwt. "Low Grade Phosphate." Quality very similar to No. 5.

Between 4 and 5 had been a strip of millet recently reaped which had been treated with 5 cwt. of Weenen phosphates. The stubble was sufficient proof of the excellent quality of the crop, and we were informed it stood nearly 5 feet in height.

The deputation recrossed the field about the same distance from the other end, Mr. Simmons accompanying and more fully described the lines of demarcation dividing the different experiments and the methods of cultivation, which was uniform, and the period of sowing was confined to one week. It must be also noted that the field was not sown with a view to public inspection and report; and the absence of parallel example proves this, the nearest being those of Nos. 2 and 5.

The conclusion to be arrived at by the deputation must necessarily be of a general character, and they express a hope that this fertiliser will be largely used throughout the Colony during the incoming season on other soils and under other conditions with a view to testing its undoubtedly excellent qualities, sufficient proof of which was to be seen in the rye-grass and millet alone, and great benefit had been derived by the mealie crop also where it had been applied, and the deputation have pleasure in giving a favourable opinion on the Weenen phosphates as a fertilising agent.

On returning to the homestead opportunity was afforded of inspecting the phosphates in both the natural state and after being milled. It is needless to reiterate here the very high analytic tests they bear, which are already well known to the public. The deputation have to thank Mr. and Mrs. Simmons for their courtesy and kindness, and to the former for the full information readily and cheerfully given.

Natal Agricultural Union.

PROCEEDINGS OF THE ANNUAL CONFERENCE.

(Continued from page 490.)

THE election of office-bearers for the forthcoming year occupied a large portion of the morning of the second day.

Mr. E. W. Evans was unanimously re-elected President.

Mr. H. Blaker was elected vice-president.

Mr. D. M. Eadie was unanimously re-appointed secretary and treasurer.

The following delegates were elected to represent Natal at the next Conference of the Inter-Colonial Agricultural Union:—Messrs. Thos. Hyslop, E. W. Evans, Mitchell, Scott, Leuchars, Alexander, J. Moon, Clayton, Addison, Crompton, King and Marwick.

Rev. Jas. Scott was elected a life member of the Union.

The following were elected to the executive:—

District No. 1.—Messrs. C. H. Mitchell, H. Bazley, T. Burman, W. W. Sykes, J. Kirkman.

District No. 2.—Messrs. J. Scott, J. Moon, J. Marwick, O. Hosking, Col. Leuchars.

District No. 3.—Messrs. W. L. Oldacre, D. R. Bester, A. von Levetzow, H. Wiltshire, W. Dukes.

Mr. Mitchell moved:—

“That, owing to the stopping of ox transport throughout the Colony, it is absolutely necessary for the Government to make adequate provision to meet the needs of the country with transport.”

Mr. Sykes seconded; and the motion was passed unanimously.

RE-STOCKING FARMS.

Mr. Von Levetzow moved on behalf of the Uitumfolosi or Ward 1. (Vryheid) Farmers' Association:—

“That this Union resolves to again approach the Government with the view to obtaining assistance for farmers who have lost their stock through East Coast Fever, each farmer so affected to receive about one hundred sheep on the existing hire system.”

He said that the Minister of Agriculture had advised them to apply for assistance to the Land Bank. The assistance they wanted was not obtainable from the Land Bank. They had been helped with sheep in his district, but out of 450 applicants only 70 got sheep, and this was not sufficient assistance. He said that sheep did well in the Vryheid district: there the lambing percentage was something like 90 per cent. The

Government had acknowledged that they lost nothing by supplying farmers with sheep.

Mr. W. L. Oldacre (Dundee) seconded the resolution. Mr. Von Levetzow was not asking for a gift. What he asked for might be regarded as a good investment on the part of the Government.

Mr. Van Rooyen pointed out that the men who had been given sheep by the Government were now doing well.

Mr. Langley said they wanted more men on the land: here were men on the land, but how were they to live, when they were so badly in need of assistance and no assistance was forthcoming?

Col. Crompton suggested that they let the matter stand over pending the receipt of information from the Government respecting the manner in which the money which had already been lent to the Northern Districts farmers had been used.

Mr. Woods said that the farmers in question had lost their cattle on account of their own neglect.

Mr. Moon pointed out that a large amount of money had already been spent on the northern districts; and, while he sympathised with the mover and the resolution, he did not see that they were justified in asking for repeated assistance. Let every man work for himself. Why should the taxpayers of the Colony be repeatedly asked to bear the burdens of the farmers? He could not support the resolution.

Another gentleman pointed out that the people of the northern districts were merely desirous of placing a business proposition before the Government and were asking the Conference to back them up.

At this point the Chairman stated that a telephone message had been sent to the Government, and a reply had been received to the effect that in June, July and August, 1907, 400 applications for assistance had been received from farmers in the Northern Districts, of which 100 had been granted. The following year all of these gentlemen had paid up without exception. This year already a considerable proportion had paid although payments were not yet due.

Mr. Wilshire said the farmers had suffered and were suffering. The English-speaking section of the delegates sympathised with the Dutch farmers, and they ought to support them in their wants.

Col. Leuchars spoke in favour of the motion. They were not asking for charity but merely for the loan of sheep.

Mr. D. C. Dick also spoke in favour of the motion.

The resolution was carried unanimously

Mr. Smallie moved on behalf of the Dundee Agricultural Society:—

“That this Union is of opinion that Government should advance small sums of money to such farmers in this district who, having lost all their cattle by East Coast Fever, are not in a position to re-stock with sheep and goats; for the purpose of enabling them to purchase small

stock, and thus prevent such persons from leaving the Colony and the land becoming derelict."

He said that there were numbers of farmers leaving the Colony owing to the extraordinary state of affairs following upon the East Coast Fever restrictions. The object of his Association was to obtain small stock that were not susceptible to East Coast Fever. He asked leave, however, to withdraw in favour of the previous resolution.

FENCING.

Mr. T. G. van Rooyen, on behalf of the Krantzkop Farmers' Association, moved:—

"That it is the opinion of this Union that the Government should immediately fence all main roads in such districts where East Coast Fever exists, and where cattle are continually being driven to the railway terminus for slaughter purposes from infected areas."

Mr. Marwick did not see the necessity for either this resolution or the following one, and he suggested to the mover that they be withdrawn.

Mr. King said this resolution would stultify the one passed that morning.

Mr. Blaker thought the Government had quite enough to do to erect fences where necessary without giving the assistance asked for by the resolution.

Col. Leuchars thought that many of the public roads, through which infected cattle were passing, should be fenced before infected areas were.

Mr. Marriott said that if they could get roads fenced and farms fenced they would be able to control the illicit movement of stock.

Mr. Scott moved an amendment, suggesting the striking out of the words after the word "exists."

Col. Crompton seconded. They could not pass the motion as it stood.

Mr. Van Rooyen accepted this amendment

The resolution in its amended form was then carried unanimously.

The next motion on the agenda paper (dealing also with fencing) was withdrawn.

NATIVE FARM PASSES.

Mr. G. I. van Rooyen moved on behalf of the Umvoti Farmers' Association:—

"That this Union urgently requests the Government to introduce some legislation to compel every native in the Colony to carry a pass when leaving the farm on which he resides. This pass to be issued either by the landlord or any other person authorised to do so."

Mr. Woods pointed out that already identification passes were in existence, and every native must have one.

Mr. Carter said it would cause great hardship to natives living on farms owned by absentee landowners.

Capt. Percival thought that the period for which an identification pass was available should be stated on such pass. This, he thought, should be included in the motion. He added that he had known of boys using one pass for three and four years.

Mr. Nunn asked how they would deal with natives on the locations.

Mr. Wiltshire considered that their present Identification Pass Law was quite sufficient. Why should they treat the native as a slave and place additional and unjust hardships upon him?

Mr. Marwick asked whether it was the intention that a native should get a pass every time he wanted to go over the farm boundary.

The mover replied that this was the object.

Col. Crompton asked how long identification passes were available for.

Mr. Scott said they were life tickets.

Mr. Dick was opposed to the resolution. 'They had badgered the Kafir quite sufficiently already.

Mr. Van Rooyen, in replying, said that the object of bringing this forward was that the landlord should have proper control over the natives in his employ. With regard to native locations, these could receive a permanent pass. The same thing was done in the Transvaal and was working satisfactorily.

The motion was lost.

STEAM PLOUGHS.

Mr. Dukes moved on behalf of the Uitumfolosi Farmers' Association:

"This Union requests the Government to sell the steam ploughs, which have been useless in consequence of the high tariff, and to utilise the proceeds for the purchase of draft animals in the districts denuded of cattle."

Mr. Von Levetzow supported the resolution. He said the charge for the use of the steam ploughs in the northern districts was £5 10s. a day.

Mr. Anderson said that the steam ploughs on the coast had been of great assistance. The charge of £5 10s. a day was certainly not excessive, considering the area they could plough per diem. He would rather suggest the purchase of more steam ploughs.

Mr. King said he understood that the ploughs were covering the interest on them. He had found that these ploughs could do work that he had not thought steam ploughs could do.

Mr. Hulett said he was sorry to see any society bring forward such a retrograde movement. These ploughs had been the salvation of the small sugar planters on the coast. He thought, instead of selling the ploughs, they should purchase more.

Mr. Van der Spuy recommended that they should let the resolution stand down until next year.

Mr. Dukes said he was pleased to hear from Mr. Addison and others that the steam ploughs had done such good work. In view of that, he asked leave to withdraw his motion.

The Chairman recommended that small farmers should combine to use the ploughs.

Col. Leuehars said he did not think that the ploughs were of much good to the poor man, as he understood that they were not suitable for small areas. For large and dry areas they were, however, especially useful.

Leave was granted for the resolution to be withdrawn.

RAILWAY RATES.

DIFFERENTIAL RATES.

Mr. Marwick, of the Richmond Agricultural Society, moved:—

"That this Union wishes to enter its protest against the present method of computing rates on the Natal Government Railways, and differentiating against the branch lines whereby the inhabitants of outlying districts, served by such branch lines, are unfairly treated."

He pointed out that there was no trans-shipping to be effected, and there was no reason why short distance charges should be made.

Mr. Scott thought the present method of computing the charges was iniquitous.

Mr. Langley opposed the resolution; he thought the lines should be made to pay.

Col. Crompton pointed out that the branch lines fed the main line. Although each individual branch line might not pay, they all helped the main line to show a profit. Their railways should pay interest on the cost, and a small surplus, but nothing more. He did not want a farmer's living taken away by iniquitous railway rates, and he considered that the people living on the branch lines should have every consideration.

The motion was carried unanimously.

S.A.P. RATES.

Mr. Greene moved on behalf of the Nottingham Road Farmers' Association:—

"That, in the opinion of this Union, the N.G.R. rates on agricultural products and live stock, especially small consignments of the former, are detrimental to the interests of the farming community."

Mr. Parker seconded and gave as an instance that he could send 24 cases to Durban for the same rate (2s.) as one case. This was charged for handling the one case, and the charge he considered was excessive.

Mr. Fleming thought the words "of the former" should be deleted. He would then be prepared to support the motion.

Mr. Greene agreed to the suggested alteration.

Mr. King said the evil had its effect upon the consumer as well as the producer. Small consignments should be sent on the railway as cheaply as possible, in the interests both of the consumer and the producer.

One delegate suggested the formation of a co-operative fruit farmers' association in order to do away with the middleman.

Mr. Wiltshire pointed out that the farmers of the Colony were suffering great loss through the middleman. He certainly thought a co-operative association should be formed.

The motion was carried unanimously.

BLUE-TONGUE VACCINE.

Mr. Dukes moved on behalf of the Uitumfolosi Farmers' Association:—

"That this Union has learned with regret that some Blue-tongue vaccine supplied by the Government has caused the death of a considerable number of sheep of a couple of farmers in the Northern Districts, and resolves to request the Government to compensate the respective farmers and to take proper steps to avoid a recurrence of such serious loss in future, as such sad experience might otherwise lead to hesitation on the part of farmers who might wish to use remedies prepared by the Government."

He referred to the cases of two farmers having suffered serious loss through the use of vaccine supplied by Government. Mr. Kolbe had lost 461 sheep through inoculation, whilst another had also lost a large number. Both of them were experienced men. A widow also lost 230 in the same way. Mr. Viljoen had lost 23 ewes and 5 rams; and there were other cases. He considered that the vaccine used was not sufficiently attenuated and caused Blue-tongue in a most violent form. Serum from the Transvaal, on the other hand, had been used, with excellent results. He was sure the Natal serum was not supplied with the consent or instruction of the Bacteriological Department. It was, he thought, due to want of funds and so want of assistance in the Bacteriological Department. He thought the whole matter required the closest investigation.

Mr. Power said that he knew very little about the matter, as it concerned the Bacteriologist. He said that some thousands of doses have been supplied and some hundreds of farmers had used the vaccine, and he had heard of accidents in no other districts. With reference to Mr. Dukes' remark regarding the use of Transvaal serum, he thought that it was only fair to point out that accidents had occurred in the use of serum supplied by the Transvaal Government.

The President said that as Mr. Pitchford was away from Maritzburg

on sick leave it would be as well to read again Mr. Pitchford's report (included in the President's report published in our last issue). The report was accordingly read by the secretary.

Mr. Von Levelzow said there was no animosity between the Northern District farmers and the Department of Agriculture. There was, however, some mistake with the vaccine; and if there was a mistake the Department should acknowledge it.

In reply to a question, Mr. Dukes said that the sheep began dying within a fortnight after vaccination.

Mr. Ballam asked if the sheep were dying before inoculating? Were the two lots of sheep inoculated with Natal and Transvaal serum at the same time?

Mr. Dukes said the sheep were inoculated at the same time. With regard to the other question, the sheep were perfectly healthy before inoculation. Moreover the sheep were not running in the lowlands.

Mr. Woods thought it quite possible the sheep had not been inoculated in time.

Mr. Dukes said the sheep were inoculated in time by experienced farmers.

Mr. Millar said that he had lost a number of lambs from abortion in the ewes after using vaccine from Pretoria. What the reason was he could not say, but the whole matter required careful investigation.

Mr. De Waal said it was not a question for the Union. Let the owners of the sheep approach the Government. If they could not get redress, after proving that the sheep had been lost through the use of the vaccine, then the Union could take the matter up. (Hear, hear.)

Mr. Smallie moved as an amendment that the Union urges upon the Government the necessity of full investigation into the matter.

Mr. Greene thought this was a case for the Law Courts to decide. He proposed an amendment in favour of full enquiry and of compensation being paid to the farmers concerned.

Mr. King moved that the Union proceed to the next business on the agenda.

Mr. King's motion was lost.

Mr. Greene's amendment was lost.

Mr. Dukes withdrew his motion in favour of Mr. Smallie's amendment, which was then carried.

RATES ON LUCERNE.

Mr. T. Burman moved on behalf of the Durban and Coast Society of Agriculture and Industry:—

"That in the interest of lucerne growers and consumers generally, this Union recommends that the railage rate on lucerne from Weenen and Greytown be 16s. 8d. per ton irrespective of cost at sending station."

He considered that the present rate (£1 8s. 6d.) was too high, and that the lucerne industry, which was likely to grow, should have some encouragement. His Society considered 16s. 8d. a very fair freight.

Mr. Scott supported the motion. The effect of the present rate would be either to cause farmers to send inferior lucerne to market, or to induce fraudulent practices.

Col. Leuchars opposed the resolution. He did not think it fair to expect the Government to carry produce at a loss when farmers were making a good return out of the produce. He would go further and say that the same remark applied to mealies. Mealies were being carried at a loss, whereas the grower was getting good value and could afford to pay a higher freight. The Government should derive some benefit from increases in the price of produce.

Mr. King said the previous speaker had entirely missed the point of the motion. He asked if the principle of charging higher freight on produce that was getting a high price was a proper and just one? The railway should have nothing whatever to do with the value of produce: they were only concerned with the tonnage.

Col. Crompton said that the railways should not be a taxing machine: they should merely pay interest and expenses and perhaps a little over, but that was all. (Hear, hear.)

Mr. Dick opposed the resolution. He agreed that the railways should not be a taxing machine, but they were a taxing machine, for all that. He thought a general mileage rate for produce all over the system should come into vogue. (Hear, hear.)

Mr. Marriott also spoke in favour of the motion.

Mr. Marwick moved the substitution of the word "fixed" for "16s. 8d. per ton."

Mr. Newmarch asked why the same rate should apply both to Weenen and Greytown when their mileages from Durban were different?

Mr. Marwick pointed out that it was not a similarity of rate that was suggested, but it should be irrespective of the value of the lucerne.

Mr. Marwick's amendment was carried.

GATES ACROSS MAIN ROADS.

Mr. Payn moved on behalf of the Richmond Agricultural Society:—

"That this Union is of opinion that farmers should, with the approval of the local Advisory Boards, be allowed to erect gates across main roads, and that they should not be compelled to keep guards on such gates, as is the case at present."

The mover pointed out that it was often a hardship to have to provide guards—which his Association considered was an unnecessary expense.

Mr. King moved the insertion of the words "and the Public Works

Department" after "Advisory Board," and an addition to the effect that all persons using the gates and leaving them open be liable to imprisonment upon conviction without the option of a fine. He maintained that gates were of no use unless measures were taken to prosecute persons who left such gates open.

Mr. Cadle seconded Mr. King's amendment.

Mr. B. B. Evans asked what use such gates would be? Any natives could drive stock through them, and illicit movements could very easily take place. He pointed out the disabilities which ladies riding or driving alone would be under if such gates were erected every half mile or so. If gates were erected, then guards should be provided.

Mr. Miller drew attention to a previous resolution providing that main roads be fenced. In that case what did they want with gates?

Mr. Marriott was also of opinion that guards should be provided.

Mr. De Waal said he was surprised to see the opposition which was being offered. Gates across the main roads were necessary.

Col. Leuchars said that they must pass the resolution if they were going to be consistent for if they were to fence the main roads such fencing would be useless without gates across the roads.

Mr. Fleming moved the following amendment:—"That the East Coast Fever Act No. 32 of 1908 be so amended as to read that (a) Advisory Boards be empowered to order the erection of gates across main roads, and that gates shall only be in charge of such guards if so ordered by the Chief Engineer, P.W.D. (b) That an Advisory Board shall decide where gates are to be built, and that persons leaving gates open shall be prosecuted."

Mr. Van Rooyen would support the resolution if the words "where the roads are not fenced on both sides" were added after the words "across main roads."

Mr. Payn was not prepared to agree to this addition, and Mr. Van Rooyen accordingly submitted an amendment embodying his suggestion.

Mr. Marwick said that nothing would stop the illicit movement of stock, but a shut gate would certainly stop wandering stock.

Mr. Carter asked why, if they had gates on by-roads, there should be any objection to gates on main roads.

Mr. Van der Spuy pointed out that many gates would be left open if there were so many erected. The fencing on both sides would be sufficient.

Mr. Newmarch supported Mr. Van Rooyen's amendment. It would be a great hardship in these times of depression to have to keep probably two guards to look after them. He questioned the use of fencing the roads if gates were not erected.

The amendments and the original resolution were then put to the meeting. The original resolution was carried by 34 votes to 18.

MEALIES IN TEN-TON TRUCKS.

Mr. W. L. Oldacre moved on behalf of the Upper Biggarsberg Farmers' Association:—

"That this Union requests Government to so alter the rule in force on the N.G.R. with regard to the conveyance of mealies for export overseas that the grain for this trade may be carried in ten-ton trucks instead of in twenty-ton trucks as at present, at the special export rate, in order that producers situated at a distance from the railway line may have an opportunity of selling their mealies for export, and benefiting by the reduced rate."

Mr. Oldacre said there was often difficulty in getting road transport sufficient to fill the 20-ton trucks in general use, and they should be in a position to send mealies off in 100-bag instead of 200-bag lots.

Mr. King suggested the alteration of the word "truck" to "consignment" in both cases.

This was agreed to by the mover.

After several delegates had spoken in favour the motion was put and carried unanimously.

TRANSVAAL POTATO RESTRICTIONS.

Mr. Burman, of the Durban and Coast Society of Agriculture and Industry, moved:—

"That this Union desires to point out to the Government the severe handicap and hardship upon potato-growers and consumers if the restrictions are carried out as published, and recommends that the same should be amended or cancelled, as certain diseases scheduled in the new decree are of such a peculiar character and so sudden in their onset as to render it impossible for anyone to import seed if the regulations are maintained."

Mr. Heenan considered that the Government restrictions were not one bit too severe. There was no hardship on the growers, but on the produce merchants. He moved the following amendment:—

"That, in view of the action taken by the Transvaal Government with reference to the restriction on diseased potatoes, this Union urges the Government to be most vigilant with the inspection of diseased seed at the port and to have the same destroyed; and under no conditions to allow any to be landed unless accompanied by a certificate by a Home or French expert that they have been examined and found free from disease."

Mr. Burman withdrew his resolution in favour of the amendment.

The amendment was carried.

FIREBREAKS ON WATTLE PLANTATIONS.

Mr. Newmarch moved on behalf of the Seven Oaks Farmers' Association:—

"That, in the opinion of this Union, the time has come when legis-

lation should be introduced to compel owners of wattle plantations which abut on boundaries to keep them free of all grass, scrub, or other inflammable stuff for a distance of ten yards' width each side of fence or boundary."

Mr. J. M. Van Rooyen considered the resolution a very important one. A safeguard was essential in view of the fact that when plantations were cut down the branches were often left, thereby creating danger of fire spreading from one plantation to another.

Mr. Landsberg believed that there was already a law in force applicable to the subject (the Grass Burning Act).

Mr. King doubted whether the Grass Burning Act would apply. Legislation should be introduced to compel the removal of dead branches, etc., on boundary lines.

Mr. Marwick pointed out that last year a similar resolution had been passed, and to be consistent the Union must pass the one now before the meeting.

Mr. Payn suggested the embodiment of a provision that the principle should also apply to plantations abutting on railway lines.

Mr. Newmarch agreed to the suggested insertion.

The resolution was carried unanimously.

OBSTRUCTED BY-ROADS.

Mr. Newmarch moved on behalf of the Seven Oaks Farmers' Association:—

"That, in the opinion of this Union, the owners of land through which by-roads pass should be compelled to keep such roads free of growing obstacles, dangerous to traffic, such as falling trees and branches, etc."

Mr. Van Rooyen supported the resolution.

Mr. Mitchell remarked that it was ridiculous to expect farmers to keep private roads running through their farms clear for the benefit of others.

Mr. Marwick expressed himself in similar terms.

Mr. Carter said that where wattles were grown extensively, such as was the case in Umvoti County, it was necessary that roads should be kept clear.

In reply to a question by Mr. De Waal, Mr. Newmarch said he referred to private by-roads.

Col. Leuchars said he did not think it would be a hardship to wattle growers.

Mr. King suggested the substitution of the words "which have extended over the road from the adjoining land" for the words "dangerous to traffic," etc.

Mr. Marwick suggested the alteration of the wording of the resolu-

tion as follows: the deletion of "growing" and the substitution of the words "falling trees and branches" for the words "trees, tree stumps, etc."

Another speaker asked whose property a tree stump growing on a public road was?

Mr. Newmarch asked permission to amend his resolution as follows:

"That, in the opinion of this Union, the owners of wattle plantations through which by-roads pass should be compelled to keep such roads free of growing trees, tree stumps, etc., dangerous to traffic."

The resolution as amended by Mr. Newmarch was carried.

LANDLORD AND TENANT.

Mr. Van Rooyen moved on behalf of the Seven Oaks Farmers' Association:—

"In the opinion of this Union the time has arrived when, with respect to native tenants living on occupied farms, the landlord wishing the tenant to leave or the tenant wishing to leave the farm of his landlord should by a notice of six months on either side be enabled lawfully to cancel the agreement between landlord and tenant."

Mr. King supported the motion.

Mr. Scott said that a recent Supreme Court decision proved that only three months' notice need be given by a native tenant.

Mr. Miller said that as far as he personally was concerned he had never experienced any difficulty in getting native tenants to agree to a provision for six months' notice on either side.

Mr. Parker pointed out that, in a case where a landlord gave his native tenant notice to quit, the native had at present to leave his cattle, which the landlord had to keep without any return therefor.

The motion was carried unanimously.

E.C.F.: TAX ON SURVIVING CATTLE.

By special leave of the meeting, Rev. Mr. Scott moved:—

"That, to enable the Government to promptly eradicate East Coast Fever, this Union recommends that, on the Colony being declared free from East Coast Fever, a special tax of 5s. per head be imposed on all horned cattle in the Colony."

He brought forward the motion to strengthen the hands of the Government in dealing with the other South African Governments; and he pointed out that the passing of this resolution would also show that they were willing to relieve the taxpayers of the Colony. Practically it would amount to an insurance; and any man should be glad to say he would pay 5s. in order to save his cattle.

Mr. Woods said the Secretary for Native Affairs was powerless to carry out anything of the kind among the natives, who would never pay such a tax. He was in favour of the motion, but he did not see how it could be carried into effect.

Mr. Stead supported the resolution. He could not agree with Mr. Woods. If the thing were properly explained to the leading natives there would be no difficulty whatever.

Other speakers were of the same opinion.

Col. Leuchars asked if any of them had any idea when the country was going to be free from East Coast Fever? It might take ten years to get rid of the disease, and who knew what might not happen to Natal in that time? He considered the time of the Conference was being wasted by discussion of such a resolution.

Mr. Mitchell pointed out that no suggestion was made as to whether the Government would take active measures in the direction of stamping out the disease.

Mr. Blaker said that the passing of this resolution would show the other Colonies that they were in earnest, and would have the effect of inducing the Government to take more vigorous steps towards the final eradication of the disease.

Mr. Langley said that unless the disease were taken in hand at once by properly qualified men its eradication would not be effected for years; and the passing of this resolution would have the effect of hastening its eradication.

Mr. Heenan asked whether the tax was to be on calves as well?

Rev. Mr. Scott said that the tax should be applicable to all beasts, irrespective of whether they were calves or full-grown cattle. The passing of this resolution would strengthen the hands of the Government. He mentioned that in 1907, according to the Government statistical returns, there were 416,527 cattle in the Colony, in possession of Europeans, Natives and Indians. This number would give a return of something like £100,000 to the Government.

The resolution was carried.

WHITE FARM APPRENTICES.

Mr. Smallie moved on behalf of the Dundee Agricultural Society:—

“That this Union is of opinion that the idea suggested by the Minister of Agriculture for the apprenticeship to farmers of unemployed white boys in Natal is deserving of careful consideration, as the training of boys in farm work would fit them by practical experience for their future settlement on the land, thus becoming in every way a national asset, and that the Union request farmers to aid and assist the Minister in his efforts.”

Mr. Dick said that this was a matter brought forward two years ago by the Union. The Colony was not offering sufficiently good inducements to poor farmers to settle in Natal. To obtain European lads as farm apprentices would be a step in the right direction. It was one method whereby they could obtain a good population,

Mr. Hosking also supported the resolution. The Colony was looking forward to the time when Indian labour could be dispensed with. The Kafir, however, was unreliable, and accordingly a larger white population on the farms would eventually be necessary.

Mr. Blaker said the object evidently was to train the boys as farmers, so that they might eventually take up land to farm for themselves. The matter of employing white boys on farms was a serious one. White boys, if they were to be properly taken care of, must be received into the farmers' family, otherwise, left to themselves, they might very easily sink to the level of the Kafir.

Mr. Carter was sorry that more boys were not employed on farms.

Mr. Sykes remarked that they had hundreds of Natal boys available for this training, and he considered they should take these boys before seeking for others abroad.

Mr. Lund thought they need not go to the towns for boys: there were sufficient on the farms who might be more profitably employed.

The Chairman was pleased to see the way they had received the resolution that was before them. He did not know of a better way of bringing about closer settlement than this idea of training white boys.

Mr. Dick asked the mover to strike out the words "in Natal" from the resolution.

The Chairman said it was too late to make this deletion.

The resolution was carried unanimously.

HARDENING OF ROADS.

Mr. T. G. Van Rooyen, representing the Krantzkop Farmers' Association, moved:—

"That it is the opinion of this Union that where there is no railway in a district roads be hardened and received more attention than at the present time."

He said that this was a very important motion, in view of the impossibility of using ox-transport. The roads in their present state were often too heavy for mules.

Col. Crompton supported the resolution. He thought the Government ought to give every assistance to farmers living at distances from railway stations, by providing good roads.

Rev. Mr. Scott said that he had been informed by Mr. Barnes, Chief Engineer, P.W.D., that it was all a matter of money. He would be only too glad to put the roads in order provided the requisite money was forthcoming; his Department had not the funds.

Col. Leuchars suggested as an amendment that the words "a policy for the general and gradual grading and hardening of the roads be initiated and that a special amount be annually voted for the purpose" for the words "the roads be hardened," etc,

Mr. Mitchell, representing the Lower Umzimkulu Farmers' Association, said that if the mover of the original resolution would accept Col. Leuchars' amendment he would be willing to withdraw the motion on the agenda paper on the same subject standing in the name of his Association. The Lower Umzimkulu Association's motion was as follows: "That, in view of the large increase in transport in Natal during recent years, it is absolutely necessary that the roads of the Colony should be put in proper condition by a general re-making, grading and hardening."

Mr. Van Rooyen agreed to the suggested amendment; and accordingly

Mr. Mitchell withdrew the motion standing in the name of his Association, and spoke to Col. Leuchars' amendment. He said the Government were urging the farmers to cultivate their land and produce more, yet they would not give them the good roads that were necessary for the marketing of their produce. It had been said that the upkeep of their roads was very expensive. He had gone into the matter, and he found that the cost of upkeep of roads in Natal was £6 per mile; in England it was about £55 per mile; in the other British Colonies it ranged from £20 to £30 a mile. They must have more money spent on their roads: these must be made up, hardened, and kept properly in repair.

Mr. Smallie supported the resolution. In his district (Dundee) there were no roads at all this season: the wet season had wiped them out. It was false economy to let the roads get into bad order, especially as mule and donkey transport was coming into general use.

Mr. Newmarch suggested the insertion of the words "and regrading" after the word "hardening."

This was agreed to.

Mr. Adams suggested the following amendment:—

"That it is the opinion of the Union that, where there is no railway in the district, the roads should be repaired so that a more up-to-date method of transport may be used."

He thought the motion as it at present stood was too drastic.

Mr. Blaker said that members had talked of mechanical traction. He wanted to know whether the present bridges were sufficiently strong to bear the weight of mechanical tractors. He knew of two bridges at least in the Bergville district which swayed under an ox-wagon. These would not carry a traction engine.

The resolution, amended as suggested by Col. Leuchars, was carried.

GRUB IN MEALIES.

Mr. Ballam moved on behalf of the Mid-Illovo Farmers' Club:—

"That this Union is of opinion that the serious consequences attending the spread of the mealie grub renders it necessary to take steps for

its eradication, and, therefore, urges the Government to commence an investigation with this end in view."

Mr. Ballam asked leave to substitute the word "stalk-borer" for "mealie grub." It was a very serious matter, and the trouble was getting worse and worse every year; and it was quite time that some proper measures were taken to eradicate the disease. He pointed out that mealies could not be planted in the early spring, which entailed considerable hardship on the farmer. He outlined the suggestions which had been put forward by Mr. Claude Fuller. He did not think, however, that the adoption of these means would enable them to plant in the early spring. They must look around for other measures. He referred to a virus which was in use in the United States, and to a preparation sold locally. He thought the Government should look into these alleged remedies and see what their value might be.

Mr. Bazley said he had seen Madras and Calcutta Indians growing mealies side by side. The mealies grown by the former were free from grub whilst those of the latter were infested. The Madras Indians had a method of keeping the grub down. They took out all stalks as soon as they had reaped the grain. The Calcutta Indians left their stalks for the cattle, and the succeeding crop was always infested with the grub. He had actually seen this on his own land. He thought ploughing in winter would get rid of the pest.

Rev. Mr. Scott remarked upon the system of applying arsenite of soda. Two or three drops were put into each young mealie. A native could get over one or two acres in a day. He was surprised that no one yet had referred to the matter.

Mr. B. B. Evans said the various grubs which attacked the mealies might be divided into three classes: earth-grub, middle-grub, and flower-grub. As regards the ground-grub, he had used tar with success for sixteen years. His method was to put a couple of bushels of the seed mealies into some vessel and stir coal tar into the mealies. There should be just enough tar to give the mealies a thin coating. Grain so treated would not be affected by grub nor eaten by fowls. With regard to the middle-grub, they must mix a solution of sheep dip to a strength which must be determined beforehand by experiment. The solution must not be too strong, else it would burn the mealies. This solution should be dropped into the cups of the young plants. He had found a long-spouted engine oil-can useful for this purpose. Three to five acres a day could be covered by an Indian. He could get over these two pests easily enough, but it was the flower-grub which troubled him. Mr. Nicholson had told him that "Vaporite" was a very good thing, put into the cup of the plant. This might prove a successful method for destroying the grubs, but to get rid of the moth itself was more difficult. If the moths

had no mealies to lay their eggs in, they would lay them in grasses and herbs. This was the problem that confronted them.

Mr. T. G. van Rooyen suggested the addition to the motion of the following words: "Providing such steps are not to provide for destroying mealie stalks."

Mr. Lund thought such a resolution ought never to have been brought forward. Surely they knew that Mr. Fuller had investigated the pest and published reports. They could not expect the Government to go and kill the grub for them on their own farms. Farmers planted their mealies at the wrong time: that was the fault. They had only three weeks in which to plant mealies, but that was ample time for them.

Mr. Marriott asked how they could destroy the moth from the latter end of August until December? He thought it was the right thing to encourage the exportation of fruit, but he objected to Mr. Fuller being taken from his own work and given charge of the supervision of fruit export. He thought the Government Entomologist should be sent to live in a mealie-growing district, in order to evolve a remedy for the grub.

The Chairman pointed out that there were leaflets distributed on the tables before them which showed that the Government were taking steps to ascertain a means of eradicating the pest.

Mr. Colenbrander suggested the use of smoke on the windward side of the field, which he said would prevent the moths from laying their eggs. The moth was prevalent during about ten days only.

Mr. Ballam (the mover), in reply, said he was surprised at the attitude of some of the delegates. The pamphlet referred to was three years old, so that nothing had been done for three years, apparently, to investigate the pest further; and the Union should urge the Government to take further steps in the matter. If the Colony employed scientists, they should have the results of their work.

Mr. Van Rooyen's amendment was lost. The original motion was carried.

DURBAN MARKET.

Mr. Parker moved on behalf of the Nottingham Road Farmers' Association:—

"That in the opinion of this Union there is great need of some reform in the methods obtaining on the Durban Borough Market."

He said he had four cases of rank abuse which he could lay before them. The short advices of produce formed a very serious item to farmers. In reply to representations which had been made to the Durban Corporation, it was stated that a clerk had been censured for these mistakes.

The Chairman pointed out that the Durban Corporation recognised the need for reform, and had appointed a committee to look into the

matter, of which committee he (Mr. Evans) was one. He asked if Mr. Parker would accept this assurance that the Corporation were fully investigating the matter with a view to reforms being instituted. He had for the last two years been endeavouring to get the committee to look into the matter, and had only lately succeeded in doing so. If any cases of abuse were discovered, he would advise farmers to report the same to the Town Clerk. He would like to see the resolution passed, as it would strengthen his hand.

Mr. Parker accepted the assurance; and the motion was passed unanimously.

OUTSPAN LAWS.

The following motion stood on the agenda paper in the name of the Loteni-Umsinga Farmers' Association:—

"That the outspan laws be enforced throughout the Colony, and landowners whose farms are traversed by public roads be forced to lay off outspans wherever necessary."

No delegate from the Association in question being present, however, to move, no discussion on the resolution took place.

IMPORTATION OF MULES BY GOVERNMENT.

Mr. Marwick moved on behalf of the Richmond Agricultural Society:—

"That this Union is of opinion that the Government should take steps to import mules for selling to farmers at cost price."

It was agreed that the words "and donkeys" be inserted after "mules."

The motion was carried.

REWARDS FOR TREE-PLANTING.

On behalf of the Royal Agricultural Society of Natal, Mr. Hosking moved as follows:—

"That this Conference is of opinion that steps should be taken to draw the attention of the Governments of South Africa to the advisability of adopting some uniform system of tree-planting (wattles not to be included) and that this Union is asked to start the movement by offering the following rewards for Natal of, say, £100, £50, and £25 for the best 15 acres laid down in good timber trees, 20 entries to be received or no awards to be made; the Government to be asked to appoint a judge at their own cost: judging to take place in May, 1915."

Mr. Hosking said his Society was willing to guarantee £25 towards the prize money, and he hoped the other societies would do something in the same direction.

Mr. Newmarch supported the resolution, pointing out especially the value of plantations of *Pinus insignis*. He thought it a great pity that tree-planting had not already been more extensively carried out. Whatever trees were grown, no great outlay was necessary in starting small

plantations. In Cape Colony great strides were being made in tree-planting, and the country would gain materially thereby in the future.

Mr. Dick pointed out the growing scarcity of timber all over the world. It was the duty of the Conference to encourage tree-planting. The native forests were almost cut out, and it was now very difficult to obtain native timber. He pointed out the value of the Australian hardwoods, instancing jarrah, which was now favoured by wagon-builders and others. There were parts of the Colony where jarrah and similar woods could be grown. The matter of tree-planting was of the greatest importance, and he hoped the Conference would pass the resolution now before them.

Mr. Blaker said that tree-planting was one of the most delightful occupations; but it should be ascertained first what trees were suitable for the different districts. He referred to the value of *Pinus insignis* and *P. pinaster*, and also to that of the oak. They must have trees that were deeply rooted, in order to withstand drought.

Mr. Smallie remarked that they could get reliable, up-to-date information at Cedara as to what trees should be used and what should not.

Col. Crompton said he had gained experience through failures; and he agreed with Mr. Blaker as to the adaptability of certain trees to certain soils. The benefits of tree-planting were very far-reaching. There was the beauty to the eye, and the benefit to the pocket. He pointed out that where trees had been planted over an eighth of the area of land, hail had disappeared. Hilly districts required more trees than level country. This had been found to be true all over the world. He was very strongly in favour of the resolution, which would be an incentive to young persons to plant trees.

Mr. Hulett said that *P. insignis* and *pinaster* did badly on the coast. The best tree for the coast was the *Araucaria* or Norfolk Island pine. He spoke of the Torvale gum, which was especially valuable for railway sleepers. The timber had been used in the construction of a light railway from Stanger to the Kearsney tea estates—a distance of eight miles. It did not succumb to the ravages of white ants so readily as other *Eucalypti*.

Mr. Sykes thought the tree referred to (Torvale gum) was the red gum.*

The Chairman pointed out that the resolution asked the Union to provide £175 for prizes, while this amount constituted practically the whole of the Union's income.

The resolution was lost.

* Torvale or Torr Vale Gum is the local name which has been given along the north coast to the White Ironbark (*Eucalyptus paniculata*). "Red gum" is the popular name of *Eucalyptus rostrata*, which also, we believe, does well on some portions of the coast.—Ep.

DOG TAX.

Mr. Walton moved on behalf of the Donnybrook Farmers' Association:—

"That this Conference is of opinion that the dog tax be increased, considering the loss to sheep farmers by their depredations."

Mr. Cadle expressed himself as totally against the resolution. He would sooner fight a dozen dogs than one jackal. They wanted the dogs to fight the jackals. Rather let them remove the tax already existing on dogs.

Mr. Van Rooyen (Vryheid) said that many farmers and natives kept more dogs than they really required. One good watch-dog would be sufficient to keep away the jackals.

Mr. Hulett did not think increasing the tax would remedy the evil. It was the untaxed dogs which were the cause of the mischief, not those which were licensed.

Mr. Fleming was opposed to the resolution. He would prefer to see the present law properly carried out. With regard to jackals, he was sorry to see no resolution brought up on the subject. The losses from jackals were getting more than serious.

Mr. Payn asked if dogs really destroyed jackals?

Mr. Cadle said they did. He had heard that the greyhound would go for the jackal, but the male greyhound would not touch female jackals, so that a female dog must be used.

Mr. Payn said he had heard from several experienced men that dogs did not destroy the jackals—not even the female dogs. He was strongly in favour of the resolution.

Mr. T. J. van Rooyen considered that every man keeping more dogs than one should be taxed.

Replying, Mr. Walton said he did not want to restrict the number of dogs to be owned by each farmer, but a tax would keep the number down.

The resolution was lost.

RURAL EDUCATION.

On behalf of the Utrecht Farmers' Association Mr. Van der Spuy moved:—

"That the Government be requested to establish more educational centres in the outlying districts."

He said that children in outlying districts were neglected. Better educational facilities should be provided in the form of more teachers, who should be paid on a more liberal scale than was at present the case.

Mr. Mitchell moved as an amendment:—

"That the time is now come for compulsory primary education in Natal."

This, he considered, would meet the difficulty better than any suggestion regarding increasing teachers' salaries.

Mr. Langley suggested that Mr. Mitchell include in his amendment provision for *free* primary education.

Mr. Marwick moved, as a further amendment:—

“That this Union is of the opinion that the Government be requested to make further provision for the education of children in the country.”

Mr. Van der Spuy expressed his willingness to withdraw his resolution in favour of that of Mr. Mitchell.

Mr. Marwick also withdrew his amendment.

Mr. Mitchell's motion was carried unanimously.

FACILITIES FOR DUTCH DELEGATES.

Mr. C. J. van Rooyen moved on behalf of the Seven Oaks Farmers' Association:—

“That, in the interests of the Agricultural Union, it is the opinion of this Union that a paid Dutch interpreter be appointed.”

He pointed out that the northern districts were not sufficiently well represented in the Union owing to the ignorance of the English language on the part of the members of the northern societies. He considered it only fair that all debates should be interpreted into Dutch. He said that a congress of Dutch farmers was to be held shortly, and he thought that two delegates should be appointed by the Union to attend the Conference. He accordingly wished to add the words: “That this Union select two delegates to meet the Conference to be held shortly.”

Mr. Dick said he had no objection to the motion, but the increased expense which would be involved by its adoption was a matter for consideration. He pointed out that for the most part the Dutch delegates could express themselves better in English than many of the English delegates themselves could.

Mr. B. B. Evans objected on the score of the extra time which would be taken up by interpretation as suggested.

Another gentlemen suggested that delegates should be allowed to speak in either language, and that anyone may demand an interpreter when he does not understand the language of any particular speaker.

Mr. Wiltshire suggested that Mr. Van Rooyen (the mover) and the Rev. Mr. Scott should be delegated to attend the Boer congress referred to.

Mr. Van Rooyen agreed to the addition of this to his resolution as a rider.

The motion was carried.

RAILWAY RATES.

Mr. Heenan, representing the Rosetta Co-operative Association, moved:—

“That this Union, finding that the statement made by the General Manager of Railways, in reply to resolution C as either misleading or not in accordance with fact, deprecates the manner in which the resolution has been dealt with, and urges the Government to give the matter their immediate attention and to discontinue the present pernicious system—a taxation by excessive railway rates on the produce of the country.”

In moving, Mr. Heenan remarked that the N.G.R. rates were found some time ago to be practically double those of the C.S.A.R., and since that time there had been increases on all the distances. The Natal farmer was penalised heavily over the inland farmer across the border. These anomalies had been reported to Mr. Greene, who replied, in May, 1908, to the effect that the matter would be brought before Parliament, and that, if the anomalies were not removed, he would bring in a resolution forcing the hands of the Government. Since then Mr. Greene had been appointed Minister of Railways and Harbours, and he had, instead of relieving the farmers, instructed the General Manager of Railways to impose rates which were a still heavier tax on the producers.

Col. Crompton pointed out that, the greater the distance, the more one had to pay. The increase in rates was 1d. per mile up to 100 miles and 1½d. per mile from 100 miles to 200 miles.

Mr. Mitchell remarked that there seemed to be no system upon which rates were being changed from time to time. He pointed out that the man who tried to manufacture on his own farm—as, for example, in the way of the production of jams—was placed at a disadvantage as against the man who marketed his produce in its raw state, owing to the differentiation in the railway rates. Natal tea was no longer considered Colonial produce. An effort had been made to encourage chicory-growing, but as soon as the Railway Department found that chicory was being grown upon an appreciable scale this product was taken out of the Colonial produce class and charged for at the same rate as imported chicory. But the big men who grew sugar were left alone. It was the poor grower who was hit so hard.

Mr. Sykes said he would like to put Mr. Mitchell right on the sugar question. They paid 7s. 1d. per ton for 14 miles from his station (Mount Edgecombe) to Durban.

Mr. Dukes asked if the railway was not made for Mount Edgecombe? Did this rate pay?

Mr. Sykes said of course it paid: they used to pay 4s. 11d.; now they paid 7s. 1d.

Mr. Colenbrander endorsed Mr. Mitchell's remarks on the increased rates on Natal-grown tea.

The Secretary (Mr. Eadie) read a few notes summarising the differences between the rates on the N.G.R., C.S.A.R., and C.G.R. The conclusion to be drawn from this examination was that, in the goods that were most raised in Natal the Cape Government Railways charged less, and in many cases considerably less, than the Natal rates, and that was the case to an even greater degree on the Central South African Railways. In reply to a question, Mr. Eadie stated that in the case of sugar, this product was 0.023d. dearer on the C.G.R. and 0.024d. cheaper on the C.S.A.R.

The Chairman said the results of the examination made by the Executive of the Union did not exactly agree with Mr. Heenan's statements. It appeared that the N.G.R. rates were only slightly higher than those of the other lines. A movement was on foot which would ameliorate the railway conditions, but in the meantime, if there were disabilities to be pointed out, the Union could take cognisance of them.

The resolution was carried.

ALCOHOL PLOUGHS.

Mr. Marriott moved:—

"That in the opinion of this Union the Government should introduce a motor to be driven by alcohol that would draw a two or three furrow plough or take a wagon with 10 or 12 bags of mealies on the road, so that small farmers may purchase such when proved a success, thus encouraging a Colonial industry and helping farmers who wish to have a plant of less cost than steam engines."

In moving, Mr. Marriott said that his object was to induce the Government to import an alcohol plough of such size as might prove useful to farmers with 200 or 300 acres under cultivation. A plough might be imported and tried at Cedara.

Mr. Anderson moved the following amendment:—

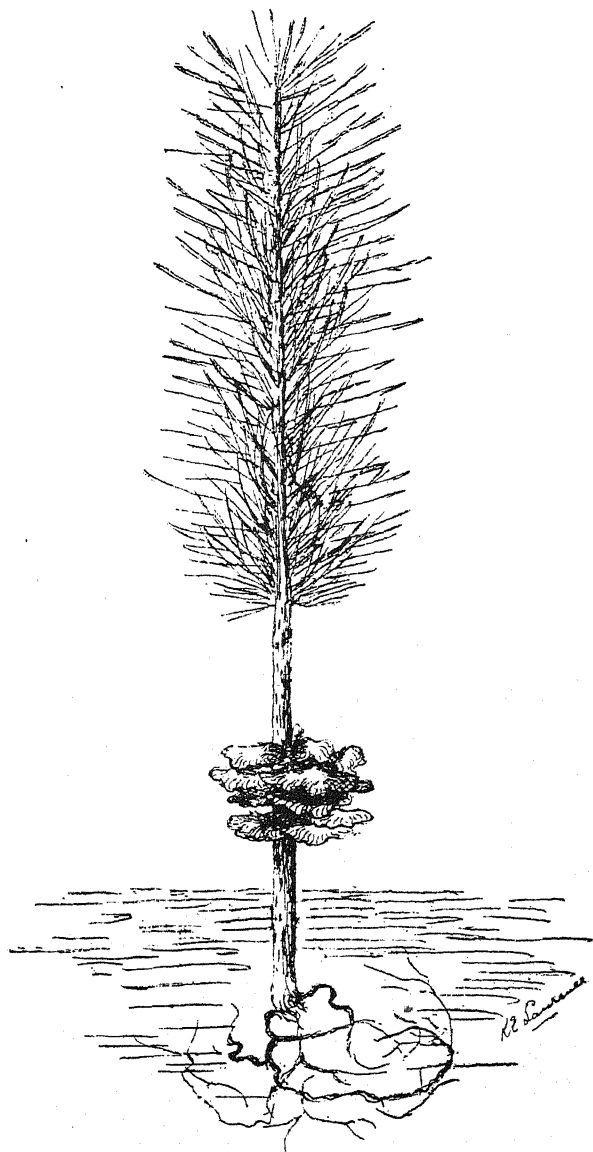
"That this Union is of the opinion that it is desirable for the Government to immediately make arrangements for the purchase of more steam or motor ploughs, the former of a lighter type than those at present in use."

He said they had had great success on the Coast with the use of steam ploughs, and he considered that they should have more of them in use in the Colony.

Mr. Dukes said that alcohol for fuel could be produced so cheaply that he thought the Government should make the experiment.

Mr. Ballam thought they were in the right direction, but they need not be too explicit. They might ask the Government to purchase some kind of motor tractor for the purpose.

The original motion was carried.



A TREE-STRANGLING FUNGUS.

Illustrating mode of attack on stem of young conifer.
(See Article.)

GOVERNMENT ENTOMOLOGIST AND FRUIT EXPORT.

Col. Leuchars moved:—

“That, while the Union appreciates the valuable help to the fruit industry given by the services of the Government Entomologist, the time has now arrived when that gentleman’s attention should again be given to the extermination of insect and other pests.”

Col. Leuchars said that the Government Entomologist had been laudably engaged with fruit export. He was a very able man, but he had been long enough at this, so that it was time he went on with other investigations.

Mr. Ballam said that fruit preparation for export was an outside subject and that the extermination of pests was the legitimate duty of the Government Entomologist.

Mr. Mitchell hoped the Government would not think they were dissatisfied with the interest shown by the Government in the fruit export trade.

The Chairman suggested a slight amendment to Col. Leuchars’ motion covering this and showing that they were grateful to the Government for what Mr. Fuller had done. This was agreed to and the resolution amended accordingly.

Mr. Adams contended that the fruit industry was essentially a part of the basis for investigation of the Government Entomologist.

The resolution was carried.

JUDGES’ ASSOCIATION.

The Chairman referred to the following resolutions which were carried at a meeting of judges and breeders held at Port Elizabeth on 28th March, 1909; and invited Mr. D. C. Dick to speak:—

“1. That, in the opinion of this meeting of judges and breeders, an effort should be made to form a judges section of the Agricultural Union;

“2. That such section be recognised as a controlling and advisory body on all questions affecting judging at agricultural shows throughout the Colony;

“3. And that, for the purpose of more adequately realising the object in view, recognised judges in the Colony who may not be members of the Agricultural Union shall be eligible for affiliation to that body.”

Mr. Dick said that some years ago an effort was made to form a judges’ association, but this association had died a natural death owing to want of co-operation on the part of the district farmers’ associations. He felt sure that the formation of a judges’ association would be in the interests of breeders, exhibitors, and the public generally if a South African association were formed. He had been connected with agricultural shows for a great number of years and had seen many exhibitors go

away disgusted with the faulty judging. There was a want of good judges.

The Chairman said that it was an attempt to form another union—a Judges' Union—for the whole of South Africa. Each Colony had a different system of judging and on different bases. At present their judging was inefficient even at their principal shows. They wanted to raise the level of judging throughout South Africa. He thought if they would pass a resolution approving of the principle and asking the Executive to go into the matter, this would meet the case.

Mr. Dick accordingly moved:—

“That this Union is in sympathy with the object of forming a Judges' Association of South Africa, and commends it to the Executive of the Union.”

This resolution was carried unanimously.

IRRIGATION CONGRESS (C.C.)

The Chairman referred to the Irrigation Congress to be held at Robertson, Cape Colony, in May. It was desired that the Union should nominate delegates to represent Natal.

Messrs. G. D. Alexander and E. Newmarch were nominated and approved.

TREE-PLANTING COMPETITION.

This terminated the proceedings of the Conference as such, which then resolved itself into a special meeting, with the President in the chair, to consider some proposals relative to a tree-planting competition, which Mr. Hosking (of the Royal Agricultural Society of Natal) desired to lay before them.

Mr. Hosking stated that Col. Leuchars and Col. Crompton had joined with him for the purpose of collecting the necessary money for the carrying out of the scheme proposed in the rejected resolution introduced by the Royal Agricultural Society, substituting in the motion the words “Royal Agricultural Society” for “Union.” The Society would thus take over the resolution bodily.

Col. Leuchars proposed the appointment of a sub-committee by the Union to work in conjunction with the Royal Agricultural Society. With this object, he proposed, as a beginning, the names of Messrs. Smallie, Newmarch and Hosking. He suggested the nomination of about seven members.

The following gentlemen were finally appointed to constitute the proposed committee:—Messrs. E. W. Evans, Hulett, Smallie, Newmarch, Dukes, Marwick, Mitchell, Marriott, Col. Leuchars and Col. Crompton.

Hearty votes of thanks were accorded the Chairman (Mr. E. W. Evans) and the Secretary of the Union (Mr. D. M. Eadie).

The meeting then broke up.

A Tree Strangling Fungus.

(THELEPHORA LACINATA.)

By J. DUNCAN DAVIDSON, A.R.C.Sc. (Dub.), N.D.A.

I HAVE observed this fungus growing on the stems of young conifers (*Pinus insignis*). The accompanying sketch, kindly drawn by Mrs. Laurence, of Cedara, shows the fungus *in situ* and also gives an idea of its mode of attack.

The fungus completely surrounds the stem, beginning near the surface of the ground and gradually extending upwards in a series of frill-like layers. These layers are united at their bases and form a close band round the stem. Their free edges are serrated and irregular in outline. The fungus varies from brown to black in colour according to the situation. In a moist soil it is darker in colour than in a dry soil.

Thelephora lacinata is not a parasite. It does not send "suckers" (*hyphae* or *haustoria*) into the living tissues of the host plant. The injury done is due to the pressure exerted by the fungus on the stem and consequent interference with the free flow of plant "food" taken in by the root hairs. In other words, the fungus simply strangles the plant it invests, hence its common name. It will be obvious that there is danger of serious loss when very young trees are concerned.

This fungus is injurious to young trees of various kinds. Ash saplings and one-year-old beech seedlings have been seriously damaged and in some cases destroyed by its ravages in Europe.

It is most prevalent in sandy heaths, where it develops on the ground in dark brown patches. It grows up the stems of the heather, throwing off loose frills as it ascends, and ultimately kills the plants. When planting in such situations the transplants should be given a clear space if the land is infested with the tree strangling fungus.

Where careful cultivation is carried on the fungus cannot spread. Breaking up of infested soil should precede planting operations, and the soil should be stirred up at least once a year. When attacked the young trees or seedlings should be thinned out and stimulated by fertilisers into rapid growth.

If a ewe dies in lambing try and give the lamb to some other good ewe that has lambed at the same time.

Export of Fruit.

SOME USEFUL HINTS AND INFORMATION.—III.

THE following is the continuation of the circular recently issued by the Cape Department of Agriculture, the first and second instalments of which we printed in our March and April issues:—

XIII. *Influence of Locality.*—It has been pretty clearly demonstrated during the past season that grapes which have been grown in shady places and in damp soils have proved quite unsuitable for export, inasmuch as apparently they cannot carry satisfactorily in cold storage. It has also been clearly shown, on the other hand, that those grapes grown in dry and sunny positions, on elevated and sloping ground, and in well-drained soils, travelled with perfect safety, and reached the market almost invariably in the best condition. No doubt in the latter case the berries were somewhat smaller, but it is, of course, much better to have a smaller grape in a quite sound state than very large berries which become almost immediately wastey on being taken from cold storage. The Department of Agriculture propose to make such investigations as may be possible, with a view to showing how far situation and quality of soil may influence the market qualities of export grapes, and the support of all interested in the fruit trade is earnestly solicited in this as in all other experimental work that may be undertaken for the development of this important industry.

XIV. *Almeria Grapes.*—The 'Trades' Commissioner has repeatedly called attention during the past two seasons to the enormous influx of Almeria grapes in the markets of Great Britain and the United States, and the consequent effect on the sale of the Cape product. Limited quantities of these grapes are grown in this Colony, and small shipments were made during 1906, but the export was discontinued on the ground that the cheapness of this variety would not warrant the expenditure upon shipment. It is advisable that further experiment be made with the shipment of this variety, which, on account of its hardy character, can be carried in ventilated holds, and whose keeping qualities enable it to be stored under ordinary conditions for long periods of time. The grape retains its good quality for many months, and the large quantities sent into Great Britain and the United States from Spain from August to November are in large measure stored up against the succeeding months, and therefore compete seriously with the poor qualities of Cape grapes. It is thought that if Almeria grapes could be shipped from the Cape in cases of the same size as the bushel boxes used for apples and arriving in London from the beginning of March to the end of April, they should command prices varying from 3d. to 6d. per lb. The sea

freight being 25s. per ship ton instead of 55s., the total cost of marketing 25 lbs. of grapes would be 3s. At 3d. per lb., this would realise 6s. 3d., which gives a fair return to the exporter. The Department will be prepared to assist as far as possible any shippers who desire to experiment with Almeria grapes, and very full information can be obtained on the whole subject on application.

XV. Shipment of Apples.—Several small consignments of apples have been sent to London during the past season, and on the whole have met with fairly successful results. It must, however, be remembered that the competition in the sale of this fruit is exceedingly keen, owing to the highly organised condition of the apple trade in several parts of the world. The points to be remembered are:—

1. That only the very highest class fruit has any chance of making remunerative prices;
2. That the fruit must be sufficiently hardy to carry in ventilated holds in order to obviate the enormous expense of cold storage freight;
3. Apples must be packed not in single layer boxes, which is far too expensive, but in the one-bushel box which is adopted by most other countries; and
4. That well-grown apples of good keeping varieties, if carefully handled and stored, will have for a long time to come a profitable outlet in South Africa itself.

Oranges.—It has been demonstrated that this fruit will carry perfectly satisfactorily in ventilated holds, and shippers should therefore insert the words "Ventilated Hold" across the face of their consignment notes. The ocean freight for ventilated hold is 25s. per 40 cubic feet, as against 55s. in cool chamber. Cheap boxes to hold about 100 oranges should be used and the large grape box (24in. x 18in. x 5½in.) is considered suitable. Very little or no woodwool should be used, each fruit should be wrapped in a piece of light paper (some fancy printing such as name, trade mark, or brand of the grower being recommended), and the fruits should be packed very tightly. Oranges should be kept in a cool but very dry place for a few days after being picked, and should be most carefully examined and graded, the largest fruit only being shipped and no over-ripe or injured to be packed. The Navel variety is particularly popular, and experimental shipments have fetched good prices.

Naartjes.—This fruit is now sold in England under its own name, and has become very popular. There is no necessity for cold storage in ocean transit, and the same rules apply as in the case of oranges with regard to packing and selection; naartjes may, however, with advantage be packed in trays or shallow boxes, those being nailed together in packages of three to five. The fruit must be large, well coloured, uniform

size, and free from all blemish. The Cape naartje is decidedly superior in size, flavour and colour to similar fruit from Spain and the Mediterranean.

Pines.—As the fullest instructions have been repeatedly issued to the pine growers on the variety, selection and packing of fruit for European markets, the subject need not be laboured here. The Cape pine is becoming very popular and has established itself in the London market. Pines should be shipped in ventilated hold, should be of the largest size possible of the sorts recommended, should have full well-developed crowns, and pines of the same size should be packed in the same box. Growers should produce Queen Pines as large as possible, and should cultivate on a much larger scale the Smooth Cayenne or St. Michael variety. The Giant Kew is not acceptable in European markets.

It is the intention of the Department of Agriculture, in consultation with the Union-Castle Steamship Company and the Harbour Board authorities at Capetown docks, to carry out certain experiments during the forthcoming season with a view to the determination of the most suitable temperatures in which fruits may be carried packed by different methods and under varying conditions. No experimental work can, however, be of the slightest use to the Colony unless the fruit growers themselves are prepared to put their whole energies into the scheme.

It is therefore confidently hoped that fruit growers, and, indeed, every interest in the Colony concerned with the export of fruit, will give the most careful consideration to the various points raised in this bulletin, and leave nothing undone to bring about that measure of prosperity in the Cape fruit trade which it undoubtedly merits, and which, with care and good management, it should certainly achieve.

The arrangements which were adopted heretofore for the supply of packing material will not be continued, and shippers must make their own arrangements to secure their requirements, and the Department of Agriculture will at all times be but too willing to consult with and advise those engaged in the export of fruit on any subject affecting their interests.

APPENDIX A.

The sizes of fruit set forth in the tables hereunder are the minimum which can be described as "Extra Selected" and "Selected" for the varieties recommended for export in this bulletin:—

PLUMS.					
Variety.					
				Extra Selected.	Selected.
Satsuma	...	...	...	2½	2
Kelsey	...	...	...	2½	2½
Wickson	...	...	...	2½	2½
Apple	...	...	...	2½	2

PEACHES.

Variety.	Extra Selected.	Selected.
Early Alexander	$2\frac{3}{4}$	$2\frac{3}{8}$
Waterloo	—	—
Brigg's Red May	—	—
Cape variety of the red melting type of "free stone"	$2\frac{1}{2}$	$2\frac{1}{4}$
Royal George	—	—
Gladstone	—	—

PEARS.

Bon Chretien	3	$2\frac{1}{2}$
Comice	—	—
Beurre de Bois	—	—
Flemish Beauty	3	$2\frac{1}{2}$
Rustenberg	—	—
Louise Bonne	$2\frac{3}{4}$	$2\frac{1}{4}$
Beurre Bosc	$2\frac{3}{4}$	$2\frac{1}{2}$
Winter Nelis	$2\frac{3}{4}$	$2\frac{3}{8}$
Beurre Hardy	$2\frac{3}{4}$	$2\frac{1}{4}$
Glout Morceau	$3\frac{3}{4}$	$2\frac{5}{8}$
D'Angouleme	$3\frac{1}{2}$	$2\frac{3}{4}$
Clapps' Favourite	$3\frac{1}{4}$	$2\frac{1}{2}$

NECTARINES.

All varieties	$2\frac{1}{4}$	$2\frac{1}{8}$
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APRICOTS.

All varieties	$2\frac{1}{4}$	2
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APPENDIX B.

INSPECTION OF FRUIT FOR EXPORT—SEASON 1908-9.

I (we), the undersigned, being about to ship fruit from this Colony to Europe during the forthcoming season (from the 1st December, 1908, to 31st May, 1909), hereby undertake to select, grade, and pack all such fruit in accordance with the instructions issued by the Department of Agriculture, and further agree to submit such fruit to the examination of the Government Fruit Inspector at Capetown Docks, and to accept the decision of the said Inspector as to the grade in which such fruit shall be placed; and in the event of the fruit consigned by me (us) being declared by the said Inspector to be unfit for export, for any reason whatever, I (we) agree that such fruit shall not be shipped, but shall be realised on my (our) behalf in Capetown either (a) at the instance of the Department of Agriculture, or (b) through such agent as I (we) may appoint.

Signature.....

Address.....

Shipping Marks.....

Railway Station.....

Telegraphic Address.....

Date.....

Witness.....

Germination of Seed Mealies.

THE VALUE OF TESTS AND HOW THEY ARE PERFORMED.

The importance of testing the vitality of corn [maize] which is intended for planting cannot be over-estimated. It is strange that farmers are willing to plant corn without first being reasonably certain that every kernel put into the ground is capable of producing a good healthy plant.—U.S. Farmers' Bulletin No. 253.

IN our last issue we drew attention to an important matter in connection with mealie growing which is being overlooked by farmers and thereby involving the loss of some thousands of pounds sterling annually to the Colony. We showed that while tillage and manuring are coming more and more to be recognised as important practice in the increasing of the maize yield of the Colony, the loss which is being incurred by poorer germination is almost entirely overlooked. We remarked that quite 20 per cent. of the seed planted at the beginning of the season fails to germinate, so that at the end of the season at the most a stand of 80 per cent. is obtained, whereas it ought to be quite 95 per cent. (allowing 5 per cent. for causes of failure over which the farmer has no control). We calculated that the farmers will lose this season something like £75,000 through the failure of 15 per cent. of the seed, which they planted at the beginning of the season, to germinate—the results of which calculations point to the fact that farmers must pay greater attention to seed selection, and so endeavour to increase their crops. As we said last month, “manures have their part to play: they will make the land itself more productive; but manures cannot give as good a stand—they will make healthy, strong plants, that will give good yields, but they will only benefit the plants that come up. You provide the plants, and the manure will make them produce large crops.” Obviously what is necessary in order to produce the maximum crop is to have a fairly good idea of the percentage of germination of the seed. This can be ascertained very simply, and in this article we propose, as we stated last month, to discuss methods of testing. In doing so we shall draw largely upon the bulletin we referred to in our last issue (Farmers' Bulletin No. 253 of the U.S. Department of Agriculture).

The germination tests should be made five or six weeks before planting time, but even if it is necessary to take the plough from the field it is far more profitable to have a good stand of mealies on 19 acres than it is to have a poor stand on 20 acres, thereby saving the time and labour necessary to prepare the ground and to plant and cultivate the additional acre. Yet many farmers are every year planting and cultivating three or four acres in every 20 for which they receive no returns.

Preparatory to the sampling of the individual cobs for the germination tests, it is essential that those of desirable type be selected in order to avoid the testing of more cobs than is absolutely necessary. This can be best done by arranging the cobs on a table or on the floor, or in some such simple manner, so that they can be carefully compared. With the mealies spread out in this way the best cobs can be removed for seed and the undesirable cobs discarded.

The number of kernels to be used for the germination test may be varied somewhat, but six kernels taken from different parts of the same cob give reliable results. The kernels from cob No. 1 should be placed in square No. 1 of the germinating box, the kernels from cob No. 2 in square No. 2, and so on. The kernels should be placed germ side up.

The kernels can be best removed with a dull pocket knife or similar instrument. Grasp the cob firmly in the left hand, pointing the butt of the cob away from the body. With the knife in the right hand the kernels can be easily removed by forcing the blade down along either the back or the side of the kernels. As the kernel is loosened, grasp it on the opposite side with the thumb and transfer it to the proper square in the germinating box. The first kernel should be taken about 12 inches from the butt of the cob. Give the cob a quarter turn either to the right or the left and remove the second kernel from the centre of the cob. Make another quarter turn and take the third kernel about 2 inches from the top of the cob. Holding the cob in this same position, take kernel No. 4 about 2 inches from the butt of the cob. Make another quarter turn and take the fifth kernel from near the centre of the cob. Make still another quarter turn and take the sixth kernel about 2 inches from the tip of the cob. The cob has now been turned completely around, two kernels have been taken from the butt, two from the centre, and two from near the top of the cob. If the work has been well done each set of two kernels was removed from exactly opposite sides of the cob.

At the beginning this work will undoubtedly seem laborous and some of the kernels will be injured, but with a little practice the kernels can be removed rapidly and in perfect condition. It must be remembered, however, that the side of the kernels containing the germ is toward the tip of the cob and care must be taken that the germ is not injured during the sampling.

It is important that the cobs be numbered or arranged in the same definite order as the corresponding tests in the germinating box.

A germinating box can be made in a few minutes' time from any boards picked up about the cribs or other farm buildings. The box should be about $1\frac{1}{2}$ or 2 inches deep inside and the length and width such as to suit the needs of the individual farmer, but it should not be made water-tight. It may be about $18\frac{1}{2}$ inches long and $12\frac{1}{2}$ inches wide, in-

side measurement, and afford sufficient space for the testing of 50 cobs of mealies at one time. Instead of filling the box with sand, soil, or sawdust, as is commonly recommended, the seed bed is made of heavy canton flannel or similar material, having two thicknesses of cloth for covering the kernels after the squares have been filled. A new cloth should be thoroughly washed before using.

If canton flannel is to be used, it is well to bear in mind that it comes 2½ inches wide. A box of the dimensions above given is just the right width for the canton flannel once folded, allowing for shrinkage. With a lead pencil, mark the cloth into squares each way.

For use, first wet the cloth thoroughly by soaking in water and then place the half of the cloth, double thickness, which has been marked in squares, in the bottom of the germinating box. The kernels from cob No. 1 are then placed, germ side up, in square No. 1, and so on, as already described. When all of the squares have been filled, fold the other end of the cloth carefully over the kernels. If during the sampling the cloths have become dry, sprinkle them well with water. Cover the box with a piece of glass (oilcloth may be used) to prevent the evaporation of the water from the cloths, and set the box aside for a few days to await the results of the test.

The principal advantages of a germinating box of this kind is that it is almost impossible to injure the mealies by the addition of too much water, as is frequently done where tests are made in sand or soil. Moreover, the entire development of each kernel, both root and stem, can be observed and the sampling can be done in about one-half of the time required when sand or soil is used.

Where only a limited number of cobs are to be tested a similar germinating apparatus may be made by using cloth between two dinner plates. Ten-inch plates will give ample space for the testing of 18 or 20 cobs at one time.

If the preliminary work has been well done the germinating box will need but little care until the sprouts are ready for counting.

The moisture necessary for germination is supplied from the wet clothes, and *in most cases the first wetting will be sufficient to complete the test.* However, if at any time the cloths become dry they should be moistened by sprinkling a little water over the top. If a piece of glass is used for the cover, as recommended, the amount of water condensed on the under side of the glass will usually show whether there is a lack of moisture.

Mealies germinate best at a temperature alternating between 65 degs. and 85 degs. F., representing in a way what actually takes place in nature, the higher temperature prevailing from four to six hours during the day and the lower temperature at night. Temperatures such as are found near the stove or furnace in an ordinary country home approach

these conditions quite well. It is important, however, that the temperature does not get too low during the night; a drop much below 55 degs. F. will seriously affect the reliability of the test.

The kernels should begin to germinate freely about the third or fourth day, but the counting should not be done until the sixth or seventh day, or until most of the shoots or stems are from 1 to 1½ inches long. This part of the testing must be done with considerable care and requires good judgment, as kernels will be found in all stages of development. The thoroughness of the testing depends on proper selection at this time.

If the six kernels in any one square in the germinating box show six good, healthy sprouts, the cob which they represent should be taken for seed. If one of the six kernels fails to germinate, or gives even a weak root or stem, the cob which it represents must be discarded as unfit for seed. There will also be cases in which all six kernels have germinated, but will be lacking in vigour. Under the most favourable conditions kernels of this kind might produce a good crop of mealies, but as the chances are that they will never develop, or else will produce only a barren stalk or perhaps a nubbin, such cobs should not be used for seed. It is thus only necessary to remember that all cobs showing dead kernels or weak and poorly developed sprouts must be discarded and *only those used for seed in which every kernel tested has given a good healthy sprout.*

The cobs which have shown a perfect germination are now ready to be butted and tipped and shelled for planting. In order to insure further uniformity in planting it is advisable to sort the cobs before planting into two or three grades, according to the size of the kernels. This grading may be done by screening, if more convenient.

The proper sustenance of the animal during gestation has an important bearing on milk-giving and consequently on subsequent reproduction. Many fear to keep the pregnant animal in a good condition of flesh during the period of pregnancy lest there should be trouble at parturition. Such a fear is groundless, providing the food producing the flesh has been duly succulent and has had in it a sufficient proportion of protein. It is a mistake to have animals thin in flesh, beyond a certain limit, when they bring forth their young. It is not fair to the progeny before birth and it will react against abundant milk-giving.—*Prof. Thomas Shaw ("Animal Breeding.")*

Traffics and Discoveries.

NOTES AND INTERVIEWS BY OUR TRAVELLING
COMMISSIONER.

I.—A CHAT WITH A VRYHEID FARMER.

POVERTY IN THE VRYHEID DISTRICT: ITS CAUSES.—POSSIBILITIES OF
OSTRICH FARMING.—LUCERNE GROWING.—ANGORA GOATS AND
SHEEP.—THE GIANT'S CASTLE FARMS AND SHEEP FARMING.

THE name of Mr. J. A. Viljoen, of "Stillwater," is known and respected by our northern farmers as that of one of the most progressive and successful farmers in the Vryheid Division. To meet and discuss farming matters with a man of his life-experience and judgment was a pleasure I had not been anticipating when, one day early in May, I came across him in Maritzburg and asked his leave to "interview" him for the benefit of readers of the *Agricultural Journal*. I was particularly anxious to hear his views as to the causes of and possibility of remedy for the poverty which is prevailing among the bulk of the farmers in the Northern Districts, and having already heard that he himself intended taking up one of the Giant's Castle farms that are now being offered by the Government, I was also anxious to learn his opinion of the farming possibilities of that part of the country. Mr. Viljoen very kindly consented to give me his views, for publication; and I accordingly made arrangements for a chat with him at some convenient hour.

"How do you account for the extreme poverty which is being experienced in the Vryheid District, Mr. Viljoen," I commenced. "Is it due to the late Boer War and the East Coast Fever entirely, or is it that the soil is of a poor nature?"

"It is due almost entirely to the causes which you have mentioned," Mr. Viljoen replied. "We have, of course, had other troubles to contend with, such as the disease which broke out amongst the donkeys which the Government supplied us with, droughts, and so forth. But, in so far as the condition of the soil is concerned, we have not. I am glad to say, much to complain of. There are certainly some very poor bits of land in our district, but, at the same time, we have quite a number of really excellent spots. I think the Vryheid District, on the whole, is not so poor as is generally believed. The reason of our not having produced such good yields of mealies, etc., is because we have not been in a position to purchase fertilisers, and so improve our land. However, some of us have lately been able to afford fertilisers, and I can assure you we fully appreciate the value of the investment. Indeed, we are already beginning to feel the benefits of the manures. And,

I have no doubt, a number of our friends will follow our example this coming season."

"What class of stock do you think would prove most remunerative in your district?"

"Well, that is a somewhat difficult question to answer. We are, in the Vryheid District, able to breed almost any class, the same as in other parts of Natal. Sheep do fairly well in our district, taken on the whole. There are, however, large areas where they will not thrive. But, in spite of this, I think if my friends were to invest their money in Angora goats, this difficulty would be easily overcome. Perhaps it would be of interest to you were I to relate the success a friend of mine has had with this particular class of goat. I have only just returned from the Cape, where I heard some excellent accounts of these animals. However, before I went to the Cape I called on a friend of mine, Mr. Frans Wessels, of Ventersburg, O.R. Colony, and he told me what the last clipping brought him. The clipping amounted to 20 bales, which he sold for the handsome price of £900. I think that when I get back to my farm and tell some of my friends about this, they will not hesitate long about breeding the Angora. For myself, I have just bought 100, which I was fortunate enough to purchase at the rate of 5s. each. Within the course of two or three years I anticipate a very fair clipping."

"Taking this into account, what would you advise breeding: sheep, Angora goats, or both?"

"Well, if the farmer has ascertained that sheep will thrive on his farm, it would, of course, be wise for him to breed them in preference to the goats. If, on the other hand, the farm is too dry, I should, by all means, recommend the goats. Again, there are some of our farms which are partly rich and partly poor. To the owners of these I should advise breeding both sheep and goats."

"I have been thinking that ostrich farming would be a good thing for your friends. What is your opinion? Have you had any experience in this line?"

"I have certainly seen a great deal of these birds during my tours to the Cape Colony. And, furthermore, I have had a few running on my farm for the last two or three years. They are getting along first rate."

"What crop do you plant for them during the winter months? Have you tried lucerne on your farm?"

"I do not plant anything for them for the winter months. They have plenty of grazing the whole year round. I have tried lucerne, but have not been at all successful with it. In fact, I think, there are very few farms in the Vryheid District on which it would prove a success. The soil appears to be deficient in lime throughout our district."

"You have said that the birds are afforded grazing the whole year round on your farm. However, I should think there are not many such

farms in your district. What would you advise feeding the birds on when grazing is not to be had? Is there any other crop to take the place of lucerne which could be grown with success in the Vryheid District?"

"I do not think there is any necessity of having the lucerne. An ostrich will do much better on mealies. This has been proved in the Cape Colony, and, as a result, these people are buying up all the mealies they can lay their hands on. A ration of 1 lb. of mealies per day will not only suffice, but it will keep the birds in a most prime condition. Another point in favour of feeding mealies in preference to lucerne is, that it is considerably more economical and at the same time substantial. I think my friends could do nothing better than invest their money in these birds. It has been proved that the ostrich will thrive even better in Natal than in the Cape Colony. This is, of course, with the exception of the Coast Districts. As a matter of fact, a number of the Cape farmers have spoken to me of their intention of leaving the Cape and commencing ostrich farming in Natal.

"There are certainly great possibilities in the Vryheid District. However, as I have not a sufficiently large area of suitable land to increase my flock of sheep and goats, I have purchased a farm at Giant's Castle, where I intend to carry on sheep and goat farming on a considerably larger scale."

"Is this one of the Government farms?"

"Yes. I secured the farm to-day."

"What do you think of these farms?"

"Well, I have visited them and think there are good possibilities, especially for sheep farming. In fact, I know that quite a number of Cape sheep farmers are wanting to take up land along the Berg, in Natal, as soon as they get the chance. I shall be glad to see you at any time you may have the opportunity of paying me a visit, and shall show you round the farm and let you see my stock."

This ended my conversation with Mr. Viljoen, so far as the *Journal* is concerned; and when I left him later he repeated his invitation for me to visit his Berg farm, which I hope to do later on for the benefit of *Journal* readers.

II.—A DAY AT CEDARA.

ENSILAGE-MAKING.—BULRUSH MILLET AS A SILAGE CROP.—SOY BEANS: A GRAND CROP.—EXPERIMENT WITH PORT SHEPSTONE LIME.—POTATOES: EXPORT VARIETIES.—RIDGING TURNIPS.—THE ELAND AS A FARM ANIMAL.

It was a bright sunny day that I alighted from the morning train up-country on its arrival at Cedara, and, camera in hand, made my way to the main gates of the Central Experiment Farm, bent on a tour of inspection. At the gates a conveyance was awaiting me, and a short drive

between flourishing plantations of pines and cypresses soon brought me to the building occupied by the main offices of the Farm—those of the Director of the Division of Agriculture and Forestry and his clerks, and the Farm Manager.

As the conveyance drew up, my attention was arrested by a buzzing silage cutter and blower that, driven by the stationary Farm traction engine, was engaged in filling the great silo near by; and this was the first object of interest that Mr. Reid, the Farm Manager, took me to see. Here, under the supervision of Mr. Aird, the Farm Engineer, bulrush millet was being chopped up into $\frac{1}{2}$ -inch lengths and blown up into the silo at the rate of about 15 tons per hour by an Ohio No. 7 cutter and blower. To the right of the machine lay a great heap of freshly cut and succulent-looking bulrush millet which was continually being reinforced by supplies from the vleiland at the north-eastern end of the Farm. This bulrush, or pearl millet, is not as well known as it might be among our farmers. A plant with often several thick stems from the one root from six to ten feet in height, and bearing as many as 25,000 and even more seeds per plant, it is a crop that should prove valuable both for green fodder, hay, and grain, in the warmer portions of the Midlands and on the Coast belt; and this year at Cedara they are testing its qualities as a silage crop. In this respect it is said to rank second only to teosinte. At Cedara it has been found to grow well upon soil even too poor for mealies; and in exceptional cases, Mr. Sawyer says, 30 tons of green feed, of $6\frac{1}{2}$ tons of hay per acre, have been cut within six weeks of planting; after a second seven weeks a second cutting of 55 tons; and a third cutting has been taken the same season.

When I visited the Farm ensilage-making had only recently commenced, so that I was able to take a good look at the silo. It is a stave silo, with a capacity of 300 tons, standing, of course, on a concrete foundation. In case of seepage there is a pump installed, connected with the bottom of the silo. The cutter and blower is, as I have said, an Ohio No. 7, knives making 750 revolutions to the minute. The knives can be made to chop into $\frac{1}{4}$ -in., $\frac{1}{2}$ -in., $\frac{3}{4}$ -in., and double these latter lengths, but $\frac{1}{2}$ -in. and $\frac{3}{4}$ -in. are the lengths most favoured. The photo. in the present issue of the *Journal* will give an idea of what the whole outfit—silo, cutter and blower, and engine—looked like when I saw it.

Mr. Reid then took me for a tour around the more interesting portions of the Farm. Down one road we passed, first, strips planted with artichokes, comfrey, ramie, velvet beans and one or two minor crops, and then we came upon a splendid crop of soy beans, which were being grown for grain. A better crop could hardly have been wished for, with sturdy, healthy bushes bearing dozens of pods. Many of the plants were quite four feet high. Lupins ploughed under green formed the manure for this crop. The soy beans were planted in rows, and the rows were

marvels of straightness—which fact became of additional interest when one learned that they were laid down by the students themselves. Mr. Reid described the simple plan which was adopted in planting the rows. A frame holding wooden markers was fixed to the rear of the roller, the positions of several rows being thus marked with each journey of the roller up and down the field.

Winter vetches and peas came next, with a mixture of rye and wheat to support them.

We next came upon a field of Dutch clover, for grazing. This field—or rather the plots which composed it, were of particular interest, as they were the object of an experiment with lime from Port Shepstone. There were three plots comprising the experiment: the first plot had no lime, to the second raw lime had been applied, whilst the third plot had been dressed with burnt lime. The clover plants were just appearing above the ground, so that it was too soon to know anything as regards the results of the experiment.

Retracing our steps and crossing over to another portion of the Farm, we passed a plot of *Phalaris commutata*, the new winter grass. This grass had been cut twice, and had done well so far, but it was too early to make any definite pronouncement.

A considerable area was occupied by potatoes of various kinds. The greater number of these were varieties which had been recommended by English experts as suitable for export, and seed of which had been obtained through the Agent-General. All the plots looked healthy.

A number of turnip plots next engaged our attention. The seedlings were just ready for thinning out—in fact, this operation had already been commenced. Mr. Reid was enthusiastic about this field. He said that, with all his long experience both in South Africa and the Old Country, he had never before seen such a grand field of turnips. Prejudice is somewhat against the practice of ridging land for turnip-sowing, but Mr. Reid's own opinion is that the practice has much to recommend it. The chief advantage in favour of it is that cultivation can be carried on from the time the seedlings first appear above the ground. Where the seed is sown in drills on the level ground the process of cultivation is very liable to cause the young plants to be smothered. Another point is that thinning out is rendered easier. Mr. Reid said that all the thinning had been done by hand with hoes, by the students themselves; and very well done it had been, too.

A little further on we came to plots of hemp and flax, which were being tried for seed. Both crops looked well, particularly the flax.

I was unable to go all over the Farm in the one day, thus missing the interesting forestry, nursery and orchard sections, but these sections I hope to visit shortly, when I will set down my impressions for the benefit of readers of the *Journal*.

Natal Wool on the English Market.

IMPROVEMENTS NECESSARY FOR HIGHER PRICES.

THE CAUSTIC SODA AND SULPHUR DIP QUESTION.

AN interesting and useful inquiry has lately been made by the Commercial Agent for Natal in London (Mr. Francis Harrison) with the object of obtaining the views of wool brokers and associations on certain points connected with the export of Natal wool; and the results of this inquiry have recently been received by the Minister of Agriculture. Mr. Harrison sought to obtain information more particularly upon the following points, *viz.*:—

- (a) How Natal wool compares with the Australian article;
- (b) What the principal defects are which influence prices unfavourably: and in what directions Natal wool might be improved;
- (c) Whether Government inspection of all wool prior to shipment is to be recommended;
- (d) Whether inspection prior to shipment is in force in other countries, under the auspices either of Government or of associations; and
- (e) Whether Natal wool has shown signs of having been injured by the application of any stringent composition such as a caustic soda and sulphur dip.

The information supplied on these points by the brokers and others approached by Mr. Harrison may thus conveniently be considered under three heads: (1) Natal wool as compared with Australian; (2) Improvement of Natal wool; and (3) Dipping and its effects. We will accordingly summarise the information received in these three sections.

I.—NATAL AND AUSTRALIAN WOOL COMPARED.

The opinions received on this question vary. Some consider that our wool compares favourably with the Australian, while others consider that it is not as fine and is inferior as regards its spinning qualities. Again, while some, on the one hand, describe our wool as being of good length and staple, others state that it is of short staple as compared with the Australian article. These differences of opinion are doubtless due to the fact that wools from different districts and even from different Colonies (all shipped through Durban) are being considered. On one point, however, there can be no doubt, namely, that although there has of late years been some improvement in our wool, more care in skirting, classing and packing, and more attention to breeding, are necessary.

The opinions received may be summarised as follows:—

A large Hamburg broker remarks that Natal wool has a similar character to that of the Australian, both being merino. Natal, however, exports as well the so-called "coarse and coloured" wool, which is a cross-breed of Persian (black) and the original African black-faced sheep. The quantity of this kind of wool exported is, however, small. A London firm of brokers point out that "wool from Australia is different in quality and condition according to the climatic influences and nature of the soil in the various districts wherein it is grown, but the general defect as regards Natal wool is its dry and earthy condition, due, no doubt, to the dry and sandy state of the soil." Another London firm remark that our wool "compares unfavourably with Australian," on account of its being, in most cases, unskirted, insufficiently classed and irregularly packed. Another important London firm having branches all over Australia think, on the other hand, that "the best Natal wool compares favourably with the general run of Australian," and that, with careful and judicious breeding and culling of flocks combined with proper skirting and preparing for market, there is no reason as far as they know why Natal wool should not be capable of further improvement. Still another firm give it as their opinion that our wool is, by nature, inferior generally to Australian in (a) quality—i.e., fineness of fibre, and (b) spinning properties. The difference in the length of staple of our wool as compared with Australian, and the want of proper classification, are remarked upon by another authority. From still another authority we get the remark that Natal wool "compares favourably as regards quality, but in the greasy state it is not so clean as the Australian, neither is it quite so long in the staple. When scoured, however, it comes out beautifully white." Another opinion is that "the bulk of the wools grown in the Natal Colony compare favourably with the ordinary run of Australian wools; they are not of a high degree of quality for a merino type, but are of good length of staple and as a rule light in the grease." Again: "although Natal wool has shown considerable improvement of late, it is not as a rule so fine, well grown, classed or skirted as Australian; neither does it contain the spinning properties of the latter." And, lastly, we learn that Natal wool is "not equal in quality, deficient in colour, and more wasty in condition."

Such are the opinions given to Mr. Harrison. Improvement of our wool is obviously necessary, but what will be the best lines to follow? The correspondence before us contains some instructive suggestions in answer to this question, and we may consider this point next.

II.—IMPROVEMENT OF NATAL WOOL.

First let us examine the remarks and suggestions which have been made, and then see upon what points opinion is unanimous.

Perhaps the most instructive letter before us is one from the Hamburg firm already referred to, and we can hardly do better than actually quote the writer's remarks. He says:—

“Owing to the fact that the veld in Natal is partly dry and rough, the wool of the sheep does not turn out very regular; we find coarse parts—besides the clips are often seedy and contain many burrs. Besides, the wool varies in the yields: whilst a small percentage has got a yielding power of 40 to 46 per cent., the remainder gives only a yield of 35 to 40 per cent., which is a natural consequence of the veld. We find sand layers in the staple; besides, most of the Natal clips are not *skirted*, which means to say they are not properly sorted and classified. We shall give you the following main items:—

“The main object of skirting and classing is to bring the wool to the market in such a condition as to obtain the highest price possible. It need hardly be shown that the more carefully an article like wool is subdivided or sorted and prepared for the requirements of the consumer the more easily it will be sold and the higher will be its price on the average. Granting that wool must be subdivided *before* passing into consumption, the question to be discussed is whether this subdivision is better to be done by the producer, or by the intermediate trade, or by the consumer.

“Anyone acquainted with the trade will admit that with wool by far the cheapest and most rational way is to *have it done by the producer*. As an article that is brought into the trade not in bulk but in ready packed bales, the intermediate trade can do nothing towards classing. Such as the bale is packed it must be sold, and so it passes into the consumer's hands, who will have to re-sell those parts of his purchase which he cannot use himself. Now, the same sorts and qualities sorted out by the producers and sent to the market in station-packed bales would realise there their proper value and will sell a good deal lower when coming from a manufacturer. This latter cannot know at a given moment who will be in want of the sort he has to sell, and is, therefore, in the position to give the market price. He is naturally, therefore, compelled to employ an agent, who will not do his business for nothing.

“To these two principal points—

“(1) The value of wool by qualities is lower when coming from a manufacturer; and

“(2) This value is further diminished by an agent's commission—may be added as an argument in favour of subdivision being done by the producer—

“(3) Freight (both by sea and rail) is smaller when skirts, etc., go directly to their final destination instead of their going by a round-about way;

"(4) Part of the labour such as re-opening of fleeces, re-packing, etc., will be saved when done by the producers; and

"(5) It will greatly contribute to simplify the work of the buyer and save them much time in valuing.

"If, for instance, a buyer has to purchase 1,000,000 lbs. of a certain class of superior combing wools, he would have to buy—supposing the wools offered him contain, say, 75 per cent. of sorts he cannot use himself—about 3,500 bales, whilst if he could find properly skirted and classed parcels his purchase need only amount to about 2,500 bales, or 800 bales less. He would thus save time in two ways: firstly, by his purchases being sooner completed, and, secondly, by being able to value in less time.

"It is evident that every manufacturer before purchasing will soon remember the advantage he derived from buying well-classed parcels, and will calculate how much higher prices he can pay for them than for the other wool. He will no longer feel tempted to purchase a skirted or uneven lot, even if it appears to be cheap.

"To see how thoroughly this fact has been realised by buyers, one has only to watch the London and Colonial Sales. In London the excessively skirted—or rather unskirted—clips can only find buyers with the greatest difficulty at even really low rates. The greater part of the buyers pass them unnoticed, and those who put them down for buying allow a large margin for possible deception.

"We point this out more thoroughly to show why Australian and also the famous Western Cape are realising higher prices than the average of Natal wools.

"If, consequently, there can be scarcely no doubt as to the correctness and wisdom of the principle of skirting and classing, the question presents itself: How and to what extent shall it be affected?

"It must be borne in mind that the aim of skirting and classing should be to give the wool evenness of character. Therefore, whether the wool be of high or inferior character, all those parts of the fleece which could alter or seriously influence its main character—be it quality, growth, colour, yield or freedom from faults (as seedy or burry—must be taken off). On the head of the sheep the wool is generally short and felted on the neck, seedy and burry, and in addition to this on the whole of the lower part of the body (belly and shanks) the wool is coarse, hiscoloured and heavy. All these parts ought as a rule to be completely separated. In any case, however, locks and clottings should be removed.

"To sum up: *Farmers should sort their clips in (1) fleeces, (2) bellies, and (3) locks and pieces; and pack these three classes separately, marking the bales accordingly.*

"*Government Inspection.*—It might be of value if your Government would exercise an inspection or would influence the farmers in the direc-

tion indicated, although experience teaches that it is difficult to bring about improvements in this way.

“Inspection in Other Countries.”—As far as we know, the Cape Colony has got various wool-growers’ associations who give the farmers advice, etc. However, in most cases the farmers do not listen to them and go their old way. They have to find out by experience the mistake they make by not sorting the wool.”

An important London firm remarks that the principal defects which influence prices as regards our wool are disregard of improvement in breeding of the sheep and want of care in the getting up and preparation of the wool for market. “For instance, more care should be given to keeping the long wool from the short; and from the fleeces after shearing should be carefully removed all the skirts, belly pieces and dungy bits, which should be kept separate and packed by themselves. The present system of packing the pieces with the fleeces is one that should be put an end to. The habit that has so long prevailed in Natal of owners bartering their wools in exchange for goods at stores is one much to be deprecated as it leads to the habit of shearing more often than once a year and therefore materially producing a very short staple. This bartering also leads to the owner receiving much less than the true market value that his wool would naturally produce if shipped to London for public sale. However, in all these directions some improvement is being manifested now in the different South African Colonies, and in all cases to good effect. Breeding of the best merino wool should be encouraged as fine wool is always in good demand.”

Another large London firm gives the following useful advice:—

“The principal defect in South African wools is carelessness in preparation for market. Where clips are of sufficient size, say, 50 bales or upwards, the fleeces should be thoroughly skirted—that is, the bellies and locks removed—thoroughly classed for length of staple. Dealing with a twelve-months clip of about 50 bales, the following classification might be adopted:—(1) Well-grown, sound fleeces; (2) wasting and defective fleeces; (3) bellies; (4) heavy skirts and locks.

“For a six-months clip:—(1) Short, sound, light-conditioned fleeces; (2) short, poor-conditioned and defective fleeces; (3) bellies, pieces and locks.

“In the case of smaller clips—say from 20 to 30 bales—we do not advocate any minute classification, but lay special stress on the necessity of thoroughly freeing the fleeces from heavy, daggy pieces before baling. On the other hand, flocks of large dimensions, say, 200 bales or more, would lend themselves to closer classing than that suggested in the case of lots of about 50 bales, and the following is, we consider, a suitable scheme of classification:—

“(1) First combing, to comprise all long-stapled, sound, light-conditioned fleeces.

“(2) Second combing: long-stapled, sound, heavy-conditioned or dingy fleeces.

“(3) Combing: long-stapled, tender or defective fleeces.

“(4) First clothing: 6 to 9 months' wool, if any, light conditioned.

“(5) Second clothing: 6 or 9 months' wool, if any, poor condition.

“(6) First lambs: fair length, light condition, practically free from skirt.

“(7) Second lambs: defective fleeces and skirts from No. 6.

“(8) First pieces: the large, fairly light-conditioned skirtings from the long-stapled wools.

“(9) Second pieces: the smaller and more daggy portions of the skirtings from the long-stapled wools.

“(10) Bellies: belly wool removed from the long-stapled fleeces.

“(11) Bellies: pieces and bellies out of the 6 or 9 months' wool, if any.

“(12) Locks: the short, daggy bits and sweepings from shearing shed.

“As regards the question of improvement of Natal wools, the chief point, to our mind, is constant attention to the selection of suitable stock for maintaining the length and quality of the wools.”

These quotations will suffice, as they reflect the bulk of the opinions expressed by the gentlemen approached by Mr. Harrison. The main points are clear: what is necessary for the improvement of our wool is (1) the introduction of better stud animals; (2) better attention to classing—that is to say, careful grading and packing according to length of staple and lightness in grease fleece; and (3) better attention to skirting. In other words, we do not get the best value for our wool, because it is not marketed as it should be; and though our wool in itself is good, it might be better in quality—which improvement can be brought about by the introduction of fresh blood from better strains of wool sheep.

III.—DIPPING AND ITS EFFECTS.

We are glad that Mr. Harrison called for opinions also on the dipping question. We have during the last twelve months from time to time published much information on the subject, including varying and conflicting opinions; and consequently we shall give here the opinion of each of the authorities approached by Mr. Harrison, so that readers may judge for themselves.

As we stated at the beginning of this article, Mr. Harrison put the following question:—“*Has the Natal wool shown signs of having been injured by the application of any stringent composition such as a caustic soda and sulphur dip?*” The opinions expressed are as follows:—

(1) "Natal wools should not be dipped too often, but we consider the tobacco extract dip harmless."

(2) "No doubt there has been much injury caused to wool by the application of caustic soda and sulphur dip. This has been preached against for many years past, and we think that less application of this is now taking place; but too much pressure cannot be brought to bear upon owners to cease using the injurious dips."

(3) "Not so far as I am aware" is the answer given to Mr. Harrison's question by another firm.

(4) "The application of caustic soda and sulphur dip has but recently been strongly condemned by the Bradford Chamber of Commerce."

(5) "Owing to scab, from which Australia is practically free, more powerful and frequent dipping is required to keep the wool sweet in South Africa, and consequently the evil, as also the remedy, has certainly a deteriorating effect."

(6) "Natal wool has not shown signs of having been injured by the application of any stringent composition."

(7) "We have not of recent years seen signs of any damage to wools which could be directly attributed to the application of a strong composition."

(8) "No wool showing signs of having been injured by means you mention has been brought to our notice."

(9) "Except in cases where it has been improperly used the wool has not suffered from the caustic soda and sulphur dip."

Chicken Rearing in Natal.

By "WYANDOTTE."

THE question of chicken rearing is one upon which depends the success or failure of all poultry culture. No one without a complete practical knowledge of this first essential matter can hope to meet with anything except disaster in any venture they may embark upon in the way of breeding poultry. It is during the first few weeks or months of a chicken's life that it lays the foundation of future health or disease and consequently it is impossible to be too careful in the feeding and surroundings throughout this crucial period. One thing is absolutely necessary and that is that the breeder shall take a real personal interest in the young stock under his care. The most essential point towards

chicken rearing is, first of all, the careful selection of the eggs which it is your intention to either place in an incubator or under the hen. The eggs should as far as possible be of a medium size and not more than fourteen days old for the hen and eight for the incubator, and should be from fowls that are perfectly healthy and have comparatively a free range, and do not depend therefore upon their keepers entirely for animal or insect food. In preparing your nest it is necessary to make the nest on the ground so as to allow the moisture to get to the eggs, and even in very dry weather it may become necessary to damp the eggs with a little lukewarm water on the 18th day.

The most favourable time for hatching in Natal is from March to July, so that the chicks will be well grown before the cold rains come on. It is a common custom to let any hen, which may become broody, have eggs regardless of her reliability as a sitter or mother; it is always best and worth while to keep your eye on sitters and those that have proved themselves as reliable mothers. Indian games, and most clean legged cross-bred fowls make good mothers.

Food for Chicks.—Chicks do not require any food until they are over twenty-four hours old, as they have obtained sufficient substance from the egg provided by nature to last them a day or so. Then the meals should consist of soft dry food, such as chicko, rolled or crushed wheat, bread crumbs, and fresh water and access to grassy run. Some people believe a great deal in hard boiled eggs for the first week, but chicks do just as well on the above food. The food should be placed in a trough away from the grown up or older fowls and at the same time convenient for the chicks to get access to as required; they soon get to know where the food is kept. As the chickens grow bigger they can have fewer meals, with pollard or bran mash as a soft food in the morning and good whole wheat or some good grain as an evening meal; they should be fed three times a day at the least. A good feed of hemp seed twice a week induces feathering. Keep your chicks always thriving and as healthy as possible. One of the best insect foods for chicks and which produces size is white ants, if not obtainable in your neighbourhood you are lucky, send your native out with a spade and bucket once or twice a week to obtain them and give to the chicks according to your number, and you will see what short work they will make of the destructive little insect, and how your chicks will grow.

Chicken Ailments.—The most dreaded disease and at one time fatal disease which the poultry fancier had to contend with was chicken-pox, but of more recent years they have been able to cope with it if attended to in the early stages by an application of carbolised vaseline; it is necessary to isolate the infected brood. Do not let your chicks roost on perches before they are four or five months old, as if so they will have a tendency to become deformed in the way of crooked breasts.

Farm and Garden Notes for June.

By GEO. CARTER, F.R.H.S.

SERRADELLA.—I have had some correspondence recently with Mr. Robt. Gordon, of Bulwer, about an interesting crop of Serradella, which he has now in full growth, and of which he speaks very highly. I will give Mr. Gordon's report in full, and think that the result will be to induce many farmers with similar land to give the crop a trial on a small scale next season.

Mr. Gordon says: "I have planted this crop for the first crop this season, and cannot therefore pass any opinion further than that I think it will make a very excellent leguminous hay crop. Unlike Lucerne and other legumes, it prefers limeless soils, and revels in the lime-deficient red top-land of which we have so much on the high veld of Natal. It should be treated in many respects like Lucerne, but it grows on soils which are quite unsuited to that somewhat exacting plant.

"On this land, planted on December 24th, 1908, with 100 lbs. super-phosphate per acre, it is now (April 28th) 30 inches high, and in full bloom ready for cutting. Planted earlier it would have yielded two good cuts to date. The first two months' growth is rather slow, but it advances rapidly afterwards.

"It could be planted with some of the cereals in the same way as some of the grasses are planted, and would take possession of the land as a second crop. I will let you know later how it stands the frost."

Further research yields the following points of interest: It is grown in Europe considerably as a green manuring crop, and to some extent for hay. It is particularly rich in digestible protein. Results in feeding green Serradella have been highly satisfactory. The yield of dry hay per acre, from two cuts, has averaged two and a half tons, and the hay cures well. The best method of sowing is to sow in drills five inches apart, at the first spring rains if for a hay crop, putting in 20 lbs. of seed per acre. Serradella is an annual plant. The botanic name is *Ornithopus sativus*.

There would appear to be evidence that it would make a very profitable crop on our poor top lands, and if later reports prove that it will stand the frost in the Polela district it will make a distinctly valuable addition to our late autumn and winter green fodder plants, as well as an excellent hay crop.

SEED SOWING IN GARDENS.

I am afraid that it is not generally recognised that the principals of seed sowing which are quite successful in colder climates than ours can-

not be applied successfully here. Our torrential downpours, our fierce sunlight, our hot winds, and in most places a very compact soil, make the application of these principals imported from gentle and temperate climes practically a failure here. One has to find out, by experiment, methods which will prove successful under our difficulties. These difficulties are chiefly in the summer. At this time of the year, and in the early spring up to October, there are no failures to speak of, and curiously enough there are no bad seeds during the cold season.

We have a method of seed-sowing in our gardens which I have no hesitation in saying will give 99 per cent. of successes, and by which there is no waste of seed such as is bound to occur under the methods in common use. The seed beds are always full and vigorous and beautiful to look at. I would like this method to become a general one, for it will answer at all altitudes and all the year round. Let me tell you first that all our ground intended for seeds is very carefully prepared, trenched and thoroughly pulverised. Nothing can be successfully done without a bit of trouble. Seeds won't grow well in lumpy soil. After this preparation beds are made four feet wide and as long as desired, and these are always raised some four inches above the ground level, to prevent storm water from getting hold of them. The beds are then firmed down, and made level from end to end.

We sow our seeds just *on the top of these beds*—no raking in or covering with soil. Then we go to a reserve of very old and rotten manure, and sift a heap of it through a half inch sieve. This sifted manure is spread evenly over the seeds to a depth of about half an inch, and the whole bed thoroughly soaked with water. The soaking reduces the mulch to an average depth of a quarter inch, and makes it fairly compact. Watering takes place afterwards periodically until the young plants are well above the ground, frequency depending upon the state of the weather, the point being to keep the seeds equally moist until the whole of them have germinated.

If you think about this method a bit you will see how many advantages it has. The seeds are all sown at an equal depth and every seed gets through; it is impossible for the soil to cake hard over the seedlings; a light mulch, such as this really is, keeps in the moisture far better than a covering of ordinary soil; the manure feeds the young plants at once, every watering and every shower carrying down the nutriment to the roots; the seed may be sown very thinly, for you know that every seed will make a plant.

Two or three points need careful note, however. The manure should be rotted stable manure if possible—it contains fewer weed seeds than kraal manure. The beds must be fairly level, else the heavy summer rains might carry off the light covering. Thickness of the covering should be varied somewhat, adapting it to the size of the seed. The

above method does not, of course, answer for all seeds. For carrots, beets, parsnip, and a few more, the *drills* are under the mulch, the depth of the drills varying, but the mulch being well up to the ground level. Beans, Peas and Maize do not need any such protection. For flower seeds it answers splendidly unless the seeds are very small, like snapdragon or pentstemon, which, in my opinion, should never be sown but in boxes or tins in this climate. For such fine seeds the covering should be of the same nature as for beds, but the manure should go through a much finer sieve. When the seed is as small as dust—*Cinneraria*, *calceolaria*, musk—a sheet of glass should be well fitted over the tin, so that very little evaporation takes place, and no watering is necessary until the seedlings are well up. Note all this for spring use!

THE GARDEN IN JUNE.

There will be very little work going on in the garden during this month. Successive sowing of a few very hardy vegetables and flowers may be made, for September flowering and use, in the midlands. All vacant ground ought to be turned over and left to weather until required. Old foliage of such things as cannas, dahlias, marrows and pumpkins should be carefully gathered up and burnt. Many of our most common garden pests, both insect and fungoid, will be lying dormant in this dead foliage, and burning is the best method of destroying them. To turn this garden rubbish into manure is simply to put back all the insect life and disease into the garden again in the spring. If, where manure is scarce, it seems necessary to do this, a good spraying of all the decayed vegetation should be made with "Blue stone," say three pounds to 50 gallons of water.

Horses which are judiciously fed and well groomed will stand double the amount of hard work they would under careless treatment.

Cow-peas make an excellent food for dairy cows when combined with other grain and fodder in proper proportions. They are highly concentrated and nitrogenous.

All kinds of growing stock should have plenty of exercise. Animal growth can not be made successfully unless every muscle has had an opportunity to be brought into use.

Dutch Agricultural Union.

ANNUAL CONFERENCE.

ON Thursday, the 29th April, the Congress of the Dutch Farmers' Union was held at the Y.M.C.A. Hall, Pietermaritzburg. The Editor of the *Afrikaner* has kindly furnished us with a few notes on the Conference, on which we have based the following report:—

Owing to the railway strike some two-thirds of the delegates were unable to be present; and, as a result, there was a very poor attendance, so much so that a discussion arose as whether there were sufficient to form a quorum. However, in order to overcome the difficulty, it was decided that the two committee members should be included.

At the request of the Chairman (Mr. Deklopper), the Minister of Agriculture (Hon. W. A. Deane) attended the Conference. Mr. Deane heartily thanked the delegates for the welcome with which he had been greeted. He expressed a regret of not being in a position to address them in their own language; and that, through unforeseen circumstances, so few should have been able to attend. Agriculture was always a mainstay of the Colony. They still had East Coast Fever hanging over them like a black cloud. About a year ago, according to the wish of the majority of the farmers, the Government had put control of the movement of animals into local hands. Weakness or carelessness on the part of the Advisory Boards, however, had resulted in most serious consequences, therefore the Government was compelled to take the matter into their own hands again and centralise all movement of cattle. East Coast Fever officials were being appointed in all districts for the control of the disease. Their duties were to take the temperatures of cattle, and to supervise, personally, all movement of cattle. These were specially selected persons, and were liable to a week's notice. The Advisory Boards were not to be done away with, but were to afford valuable advice to the Government in relation to the fencing, etc. It was decided that the control of the removal of animals and animal produce would be taken away from them. The Minister had the power to order compulsory dipping. However, he hesitated in doing so, as a large majority of the farmers opposed it. In other respects, prospects were most encouraging. The export of mealies was increasing considerably. A new freight had been agreed upon between the Government and the Steamship Company. The freight in question was 10s. and 1s. 6d. shipping cost, instead of 10s. as previously. If Unification were brought about the joined S.A. Government would, of course, be stronger. In the shipping ring it was proved that the farmers had confidence in the mealie market. They

had spent £34,000 more in fertilisers this year as compared with last year, and this in itself proved that there was a market for the produce. There had also been a great advance in the number of applications for Crown lands, so much so that the Government had been obliged to purchase lands privately, which prevented the following of the old policy of granting the land free of rent during the first three years. During last year 500 persons had been put on the land, which is a very large number considering that the total number of farmers in the Colony is some 4,000. Government had purchased large farms in the Vryheid district, which had been cut up into 22 small farms. For these there were over 200 applications. The Government could assist the farmers in this way with £1,000,000 sterling which had been granted in 1903 for the development of agriculture.

The Chairman said that there had been much misunderstanding between the Advisory Boards in the Northern Districts and the Department of Agriculture, and trusted that the Government would be prepared to put matters right.

After Mr. Deane had left, the discussion on the adjournment was continued, and it was decided finally that the Congress would meet again on some future date during May or June at Dundee.

Messrs. I. M. van Rooyen and Rev. Scott attended the meeting in their capacity as delegates from the Farmers' Union. Their visit was concerned chiefly with the question of the combination of the Dutch and English organisations. It was pointed out that the Dutch organisation also had political objects, but the proposition was seriously considered and a discussion would be taken at the adjourned meeting at Dundee, where it was hoped that Mr. Van Rooyen and Rev. Scott would be again present.

Good feeding consists in giving as much as the hog will eat.

Be honest with your cows and your customers, and you will have no trouble producing good cream and butter and always find a ready market for both.

Pigs produce their meat upon considerably less feed than any other meat-producing animal; much of the feed, moreover, could not be used advantageously in any other way.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

It should ever be borne in mind that breed counts more than food in the production of milk, for a cow not given to milk will not become a good milker on the best of food; and, indeed, no cow can yield a large supply of milk on scanty rations of inferior food. The thing to aim at is profit, and this is best secured by having cows good for milk and flesh, and feeding them generously.—*Prof. J. P. Sheldon* (*"The Farm and the Dairy."*)

The very foundation of any success in farming is clear foresight and distinct planning for a succession of crops, each to be tended, harvested, stored and marketed in the very nick of time. The best energy of every farmer is properly given to finding what crop to raise, how and when to have it ready for the world that is going to need it.—*Dr. Geo. T. Fairchild* (*"Rural Wealth and Welfare."*)

IRRIGATION AND DRAINAGE.

As a plant contains water as its largest constituent, and as the whole of the plant food obtained from the soil is taken up through the medium of water, while the amount of water daily lost by the plant through evaporation is very large, the necessity of a large supply of water is very evident. The supply is often insufficient, as is shown by the much larger crops grown by irrigation. On the other hand, an excess of water in the soil prevents root development, and much percolation causes a loss of nitrates and other soluble plant foods in the drainage water. Deeply-rooted crops, as wheat, red clover, lucerne, sainfoin and mangel, are those best fitted to resist draught, while shallow-rooted crops, as grass and turnips, are those which suffer most from it.—*R. Warington, M.A., F.R.S.* (*"The Chemistry of the Farm."*)

INFLUENCE OF FOOD ON VALUE OF FARM MANURE.

The uses to which animals are put frequently modify in a marked degree the value of their excrements. Those which reproduce and rear young make poorer excrements than do those of like species under similar conditions which are not bearing young. Animals giving milk produce poorer excrements than those which are not in milk, when placed under like conditions. In other words, animals which are put to laborious work for many hours per day require a wide (or carbonaceous) ration, if they are to be well sustained in energy, and prevented from using expensive

nitrogenous compounds in its production, while animals kept for speed, and those which are required to do very severe work for only short periods, are most satisfactorily sustained on a narrower (or nitrogenous) ration.—*Prof. T. P. Roberts* (*"The Fertility of the Land"*).

BACTERIA IN MILK.

In Berne I have found on an average 160—320,000 bacteria per cubic inch in fresh milk, while *Cnopf* in Munich estimates the number at 960,000 to 1,600,000 per cubic inch, *i.e.*, 33 to 56 millions per pint! Whence comes these bacteria? The answer is easy if the conditions under which milking takes place are carefully considered. To begin with, the bellies and udders of the cows are soiled with dung, which is well known to harbour innumerable bacteria, and fragments of which fall into the milk. Again, the hands of the milker are usually not too clean, and therefore introduce numerous germs, while the milk pails or cans are in many cases washed with water rich in bacteria, and the air of the cow-house contains a large number of them. To this must be added that the first half gill or so of milk obtained is always rich in micro-organisms, since after milking a little milk remains in the lower part of the teat, where it is not completely shut off from the exterior and is in consequence easily infected, so that a rich crop of bacteria is produced in it by the next milking time.—*Dr. Ed. von Freudenreich* (*"Dairy Bacteriology"*).

WEEDS IN CITRUS GROVES.

The practice of keeping the ground on which the orange grove stands perfectly free from herbage and thoroughly cultivated throughout the whole season, year in and year out, has been indulged in by many and is still followed by some. This practice has little to recommend it. A soil so treated soon becomes depleted of its natural fertility and the humus soon becomes used up through constant cultivation and the application of various fertilisers. No amount of fertiliser will do the work it should if the soil once loses its natural body and becomes deficient in humus. In spite of every effort in the line of fertilising, such a soil will become poor and infertile and the trees will soon show the effects in their unhealthy condition, and the owner will realise it in his diminishing returns. . . . Humus, one of the most, if not the most, important ingredient in any fertile soil, is generally found in inadequate amounts in citrus soils, and any system of cultivation which does not tend to increase the amount or maintain a considerable quantity of this substance in the soil is not based upon scientific principles.—*Prof. H. Hume* (*"Citrus Fruits and their Culture"*).



Orchard Notes.

JUNE.

HARVESTING the citrus crop will be in full swing during June and "Care in Handling" must be the watch words of the growers. All that has been said about picking and handling in my notes for April and May apply now, and it will depend upon how thoroughly and honestly that advice is followed and practised whether our export trade flourishes or suffers.

The coast grower will pay attention to his pineapples and bananas and clean and cultivate so as to secure earlier and better fruits.

Applications of kraal manure, compost and any other slowly-acting manures to the orchard should be no longer put off if the trees are to benefit therefrom with the spring.

Unless already attended to, the orchard should be cleared up without further delay—if only to prevent the packing of the surface soil where it has been trampled in gathering the fruit.

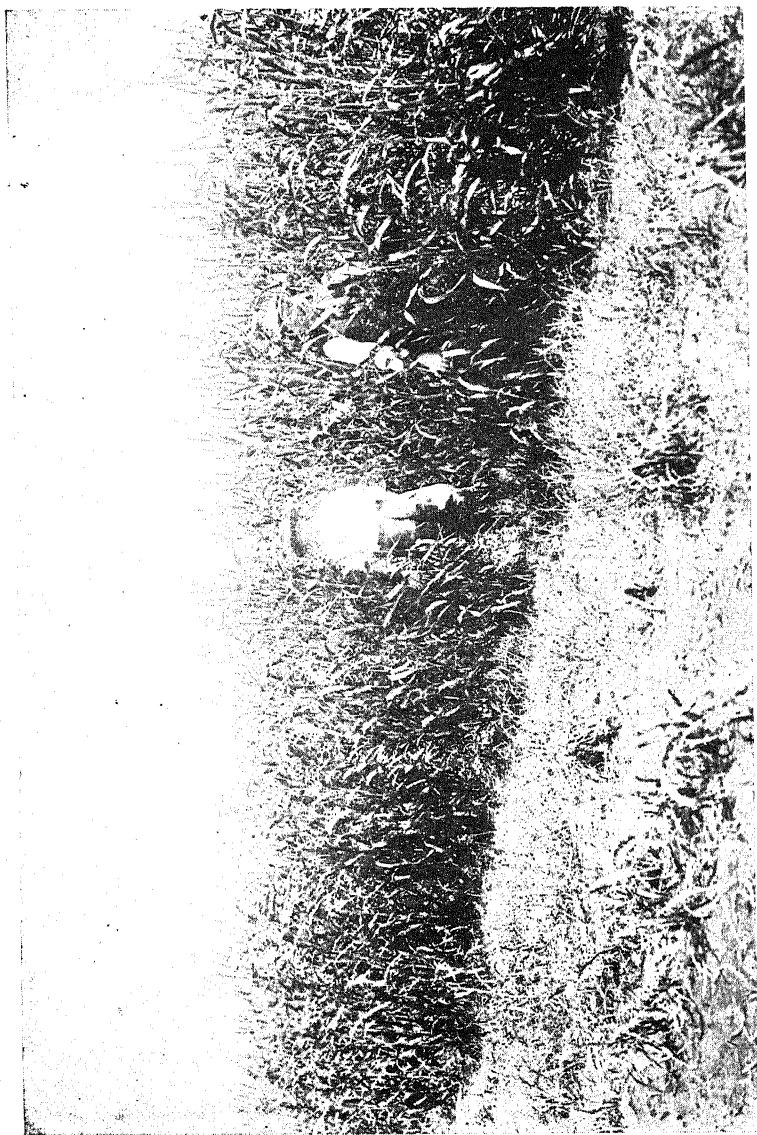
PRUNING.

Winter pruning will now have to be taken in hand in most upland orchards and a proper pruning outfit should be obtained so as to do the work as well as it should be done.

Pruners must remember that young trees require different attention from trees in regular bearing, and again that old and apparently worn out trees call for a different application of the principles of pruning.

Such principles as have been learned must be applied with care and thought, due regard being taken to the particular habit and growth of the varieties being manipulated.

Thus young trees for the first few winters are pruned entirely to attain a desirable shape, the pruner's aim being to build up a strong, well-balanced framework to form the foundations of the future fruit-producing machine. This attained, the winter pruning of the bearing



VIEWS AT CEDARA.—I

Bulrush Millet ready for cutting.

tree should be restricted to shortening in and the removal of undesirable growths, and it is to be remembered that the greater the cutting back of such trees the more they will tend towards producing wood and the less towards producing fruit the following season. Except for such light application of the pruning tools, the treatment of healthy, well-set, bearing trees which aims at fruit production is always applied during the summer months.

The renovating of old trees resolves itself into hard cutting back; and, generally speaking, where it is desirable to renovate trees, they are best cut back so that the limbs which are left form only a well-spaced framework. In the spring there will be a considerable flush of young growths from the decapitated limbs from amongst which the vigorous and the best balanced and arranged are selected to form the future head whilst the rest are rubbed out.

One continually hears a great deal about the beautiful peaches old trees were wont to bear in times gone past. Those who have these old trees can bring them back to their former glory and usefulness by renovating; and my experience is that no fruit-tree responds so readily to renovation than our old peaches.

The following are a few points for pruners:—

(1) Have good tools for the work. A good strong pruning knife, a good pair of secateurs—not a cheap and nasty line—a band pruning saw and an oil stone.

(2) Keep the knife and the blade of the secateurs sharp and clean.

(3) Remember the following axioms:—

(a) The vigour of a plant (or of a shoot) is in direct proportion to the leaf surface upon it.

(b) The more upright or vertical a shoot is the greater will be its growth.

(c) The nearer a shoot approaches to a horizontal position (or lateral growth), so its vigour diminishes. Upright growths usually run to wood alone, whilst laterals tend to fruit production.▲

(d) The fruit production of any plant is in the inverse ratio (*i.e.*, the opposite proportion) of its activity of vegetation (*i.e.*, vigorous growth). In other words, when a tree is growing vigorously its production of fruit is lessened.

(4) In removing large limbs never risk their breaking away by their own weight. First under saw the limb 4 to 6 inches away from the branch or trunk supporting it, but not so deep that the limb bites the saw. Then saw through from above about an inch further outwards, subsequently remove the stump completely close to the supporting limb or trunk. Leave no projection to form in the future a memorial to your bad work—*i.e.*, a pruner's gravestone.

(5) Cover large wounds with fairly dry paint. Any paint will do so long as it does not run.

(6) Remove young growth, *that has to be removed*, by cutting it off close to the limb it grows from. Don't remove the fruiting spurs along the main arms. This seems superlative advice, but it is not!

(7) Shorten in young growths by cutting off just above a sound bud—not too near and not too far away from the bud—and make the cut in a slanting direction parallel with the axis of the bud.

(8) After pruning gather and burn all the debris and then spray the trees thoroughly with Bordeaux Mixture.

CITRUS EXPORT.

The citrus export season started upon the 13th of May, when something over 20,000 naartjes were packed by the Government Agency and shipped by the R.M.S. "Walmer Castle."

The facilities for grading and packing the fruit are greater and a considerable improvement upon those of last season, and there is every indication of growers taking full advantage of the Government's effort to build up an export trade by shipping large quantities of their produce through the agency.

The following are the conditions under which fruit is accepted and dealt with:—

1. Except by special arrangements no fruit will be accepted for export before the 10th May, 1909.

2. Ordinarily, only oranges, naartjes, and mandarines will be classed as fruit for export. Lemons will not be accepted.

3. By special arrangement with the Government Entomologist, pineapples will be packed for export, but three weeks' notice of the intention to export pineapples through the agency must be given.

4. All citrus fruit must be coloured and mature when picked.

5. All fruit must be picked with care; proper clippers, fruit bags, and field boxes being employed. In respect of fruit which has, in the opinion of the Government Entomologist, been improperly picked, it may, at his discretion, be wholly rejected, or an extra charge of 6d. per 100 fruits may be imposed for special grading.

6. All citrus fruits must be thoroughly and properly cured for at least five days, exclusive of time occupied in forwarding to the Point. Upon no account must fruit be cured in the boxes in which it is forwarded.

7. The Agency now undertake the supply of box or lugs for railing fruit forward to the packing house, and growers must make their own arrangements in this respect. Further, no boxes are to be used for this purpose of a greater depth than 12 inches, nor more than 15 inches wide, and 3 feet long. Lids are to be screwed on, or they may be hinged and wired, but no nails or hoop iron is to be used for fastening the same.

8. Senders must pack the fruit carefully and firm so as to prevent rattling and consequent bruising in transit to the Point. All fruit must be packed upon the alternative or honeycomb pattern, and on no account is it to be packed so that the stalk end presses into the top of the fruit above or beneath it. This recommendation is to be particularly respected in the case of naartjes. Thoroughly dry shredded mealie husks are recommended as packing material.

9. All boxes are to be addressed N.G.F.A./P., on ends and on each side must be clearly stencilled the sender's name and his railway station mark. The Agency will not be responsible for any error occurring through growers sending fruit forward in boxes bearing other grower's marks.

10. All charges for carriage to the Agency are payable by senders. Empties will be returned free of rail charges.

11. The Entomologist is authorised to reject all fruits which he considers unsuited to export, whether in respect of quality or blemishes due to any cause whatever, and such rejects will be returned to senders.

12. The charges per tray of naartjes will be from 3d. to 4d. each. Oranges will be packed at from 9d. to 1s. 6d. per box. These charges will include cost of tray or box, wrappers and lining, also the charges for sizing, grading, and packing.

13. The 10 per cent. primage upon fruit will not be charged against shippers. Freight will, therefore, be entered against sales at the rate of 60s. per ship's ton for fruit forwarded in cool chamber, and 25s. per ship's ton for such as is forwarded in ventilated hold.

14. A fixed charge at the rate of 10s. per ship's ton will be made in respect of (a) shipping charges; (b) bills of lading; (c) customs entry; (d) insurance; (e) stencilling and bundling; and (f) book-keeping.

15. Senders shall be liable for any shortage which may accrue through prices realised not covering freight and charges, and such amounts may be recovered by legal process.



Fruit Calendar.

In response to a request made by the Commercial Agent for Natal in London the following rough calendar has been drawn up. The times given, of course, refer to many varieties. It is very desirable that full data upon the times of ripening of various kinds in different districts should be collected and that the calendar as drawn up should be corrected wherever necessary; I shall, therefore, be greatly beholden to any readers of the *Journal* who will furnish me with particulars in their possession.

COAST.

*(From sea level upwards to 1,000 feet.)**General.*

Tomatoes are an all the year round crop, the winter crop being looked upon as the best.

Bananas are an all the year round crop; some growers look upon the autumn fruit as the best.

Pineapples.—Small Golden Queens and Smooth-leaved Cayennes together form an all the year round crop. The main crops of the former may be set down at December to February (three months) and April, May, June and July. The main crop of the Cayenne is during the autumn. A certain quantity of both varieties are always obtainable in the off season.

Coast Calendar.

January.—Golden Queen Pineapples (main crop); Bananas; Tomatoes; Mangoes; Grenadillas; Pawpaws; Litchies; Figs (first crop); Grapes; Peaches (three latter little grown).

February.—Golden Queen Pineapples (main crop, or end of); Cayenne Pineapples; Bananas; Tomatoes; Mango; Grenadillas; Pawpaws; Litchies; Figs; Grapes; Peaches; Apples (last four little grown, not truly Coast fruits).

March.—Golden Queen Pineapples; Cayenne Pineapples; Bananas; Tomatoes; Mangoes; Grenadillas; Apples; Avocados (early); Guavas (early).

April.—Golden Queen Pineapples; Cayenne Pineapples (main crop); Bananas; Tomatoes; Avocados; very early Citrus; early Cape Gooseberries; early Guavas.

May.—Pineapples; Bananas; Tomatoes; Avocados; early Citrus; early Loquats; Guavas; Cape Gooseberries; Pawpaws.

June.—Pineapples; Bananas; Tomatoes; Avocados; Citrus (main crop); Loquats; Guavas; Cape Gooseberries; Pawpaws.

July.—Pineapples; Bananas; Tomatoes; Avocados; Citrus; Loquats; Guavas; Cape Gooseberries; Pawpaws.

August.—Pineapples; Bananas; Tomatoes; Avocados; Citrus; Loquats; Guavas; Cape Gooseberries; Pawpaws; early Strawberries.

September.—Pineapples; Bananas; Tomatoes; Avocados; late Citrus, chiefly Mandarines; Pawpaws; early Strawberries.

October.—Late Oranges; Pawpaws; Strawberries.

November.—Pineapples (Golden Queen, early main crop sometimes); Pawpaws; Grenadillas, early; Strawberries.

December.—Golden Queen Pineapples (main crop); Mangoes; Grenadillas; Strawberries (main crop); Pawpaws; Figs (first crop); Litchies; Grapes; Peaches.

MIDLANDS.

(Over 1,000 to 3,000 feet above Sea level.)

General.

Tomatoes practically all the year round in warm kloofs, more generally a summer crop.

Bananas not grown.

Pineapples.—Mostly smooth-leaved Cayenne, generally obtainable in small quantities. Main crop May, June and July.

Midlands Calendar.

January.—Peaches; Apricots; Plums; Apples; Pears; Quinces; Grapes; Strawberries; Grenadillas; Walnuts; Pineapples (a few); Figs.

February.—Plums; Apples; Pears; Quinces; Grapes; Figs; Grenadillas; Walnuts; Pineapples; Mangoes.

March.—Apples; Pears; Quinces; Figs; Grenadillas; Walnuts; Pineapples; Mangoes; Cape Gooseberries.

April.—Early Oranges; Apples; Pears; Guavas; Cape Gooseberries; Grenadillas; Walnuts; Pineapples.

May.—Pineapples; early Citrus; Apples; Pears; Walnuts; Guavas; Grenadillas; Cape Gooseberries.

June.—Citrus (main); Pineapples; Loquats; Cape Gooseberries; Guavas; Grenadillas.

July.—Citrus; Pineapples; Loquats; Guavas.

August.—Late Citrus; Pineapples; Loquats; early Strawberries.

September.—Late Oranges; Naartjes and Mandarines; Loquats; Pineapples.

October.—Very late Citrus; Loquats; Strawberries.

November.—Early Plums; early Apricots; early Peaches; Strawberries; Pawpaws.

December.—Plums; Peaches; Apricots; Figs (first crop); Strawberries; Grenadillas; Pawpaws.

UPLANDS CALENDAR.

(3,000—5,000 feet above Sea level.)

January.—Peaches; Plums; early Apples; Apricots; Figs; Quinces; Walnuts; Plums.

February.—Peaches; Plums; Apples; Pears; Figs; Quinces; Walnuts; Grapes.

March.—Peaches; Apples; Plums; Grapes; Figs (second crop); Quinces; Walnuts.

April.—Apples; Pears.

May.—Very early Citrus; Cape Gooseberries.

June.—Citrus; Cape Gooseberries.

July.—Citrus.

August.—Citrus; Loquats.

September.—Loquats.

October.—Loquats.

November.—Early Plums and Peaches.

December.—Peaches; Plums; Apricots; early Apples and Pears; (first crop).

ANALYSIS.

Coast:—

Tomatoes: All the year round.

Bananas: All the year round.

Pineapples: All the year round.

Lemons: All the year round.

Apples: February and March. Very little grown, climatic conditions generally unsuitable.

Figs: December to February. Conditions generally unsuitable.

Grapes: December to February. American varieties as a rule. Conditions generally unsuitable.

Litchies: December to February. A delicious fruit; not grown in any quantity.

Grenadillas: November to March. This fruit is not cultivated as in Australia. The crop is from vines usually growing wild.

Pawpaws: May to February.

Peaches: December to January. Not grown to any extent.

Avocados: March to July; some February to August.

Guavas: March to August.

Oranges, Naartjes, and Mandarines: May to October. Main crops June and July.

Cape Gooseberries: April to August.

Strawberries: August to December. Main crop December.

Midlands:—

Tomatoes: Summer months.

Pineapples: Smooth-leaved Cayenne—autumn crop.

Lemons: All year round.

Apples: January to May.

Figs: December to March.

Grapes: January to February.

Grenadillas: December to June.

Pawpaws: November to December.

Peaches: November to January.

Avocados:

Guavas: May to July.

Oranges, Naartjes and Mandarines: April to October.

Cape Gooseberries: March to June.

Strawberries: August to January.

Pears: January to May.

Quinces: January to May.

Walnuts: January to May.

Apricots: November to December.

Mangoes: February to March.

Plums: November to February.

Loquats: June to October.

Uplands:—

Apples: December to April.

Figs: December to March.

Grapes: February to March.

Grenadillas:

Peaches: November to March.

Plums: November to March.

Apricots: December to January.

Oranges, Naartjes and Manjarines: May to August.

Pears: December to April.

Quinces: January to March.

Cape Gooseberries: May to June.

Loquats: August to October.



Comfortable stables are economy.

Maize is much too concentrated to feed the cows by itself. For best results it should be diluted.

The breeder who has a definite idea in view can improve his animals. The one who goes at it blindly never can.

Frosts have now commenced, the first touches having for the most part occurred towards the end of April. We have received reports from the following districts:—Nel's Rust, Greytown, Albert Falls, Glenisla, Vryheid, Wartburg, Maritzburg (Rosedale Road and Chase Valley), Krantzkop, Riet Vlei and Qudeni. The damage has only been very slight so far.

The Position of East Coast Fever.

LIST OF OUTBREAKS DURING APRIL AND MAY.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st April to 20th May:—

Dundee District.—Outbreaks on farms “Beith,” “Garfield,” “Kilburnie,” and “The Chase,” sub-division of “Stony Braes” (all east of main line).

Weenen District.—Outbreak on farm “Pretoria.”

Umvoti District.—Outbreaks on farms “Misgunst,” “Perseverance,” “Boschfontein,” “Welgegund,” “Small Hoek,” “Potspruit,” and J. J. Mare’s portion of “Boschfontein.”

Klip River District.—Outbreaks on farms “Gartmore,” and “Matto-wana’s Kop” (both west of main line).

Krantzkop District.—Outbreak on J. P. Nel’s portion of “Elands-kop.”

Ungeni District.—Outbreaks on farm “Bloemendaal,” sub-division of Reit Spruit, and cattle of Mr. G. Murray.

City Division.—Outbreak among cattle of Mr. F. Lester, “Cremorne,” Mr. A. E. Clarke, Scottsville, and Indian at New England.

Lion’s River District.—Outbreaks on farms “Blackwood,” sub-division of “Alleman’s Drift” and “Weltevreden,” “Buffels Bosch,” “Hebron,” “Montrose,” “Groote Vallei” (all west of main line), “Shooter’s Hill,” and “Boosch Hoek” (both east of main line).

New Hanover District.—Outbreaks on farms “Killie Krankie” and “Broughton.”

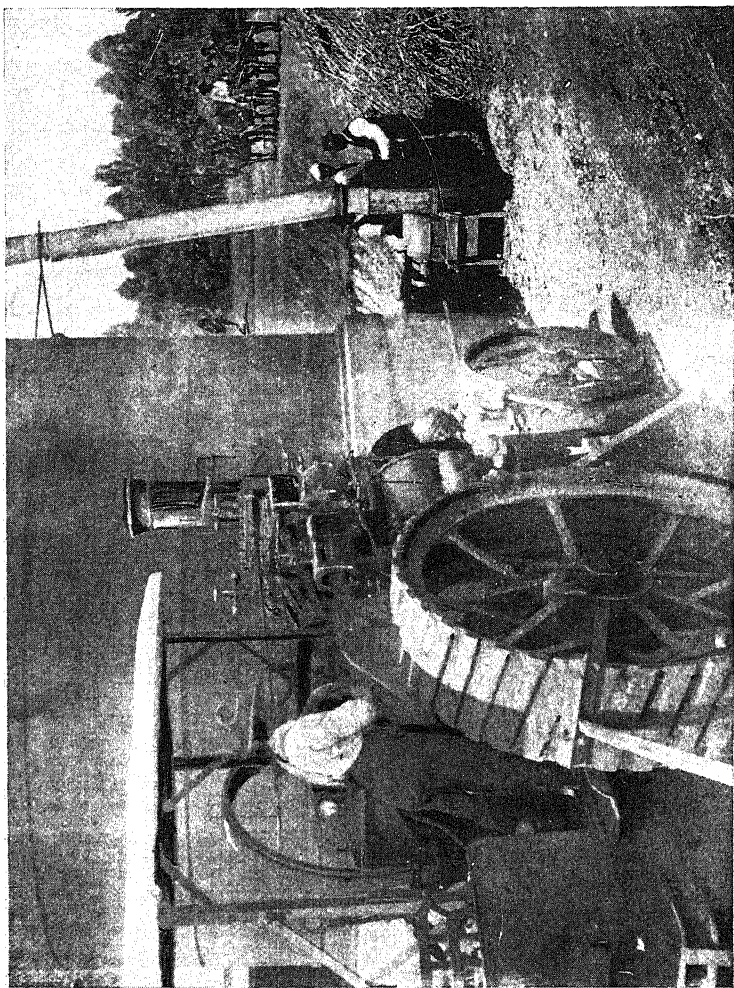
Camperdown District.—Outbreak on farm “Umlaas.”

Ixopo District.—Outbreak on farm “South Hills.”

Estcourt District.—Outbreaks on farms “Putuli Location” and “Spitzburg” (both west of main line).

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of Victoria County, Umsinga, Vryheid, Ngotshe, Babanango, and Paulpietersburg.

Dairy economy means the greatest production from the largest number of choice cows on the smallest acreage.



VIEWS AT CEDARA.—II.
Making Ensilage from Bulrush Millet.

Division of Agriculture and Forestry.

PROGRESS REPORT FOR APRIL.

IN continuation of our summary published in the last issue of the *Journal*, extracts are appended from the Orchardist's annual report, including the first definite results from an exhaustive manure experiment with different classes of fruit-trees. The present findings are, of course, only provisional, and may be modified by returns in later seasons. It is thought well, however, to give publication to each season's data. In the course of this report, the Orchardist, Mr. C. B. Parsons, reviews briefly horticultural operations at the different stations.

GOVERNMENT ORCHARDS.

At Cedara last winter some 300 plums, 90 apricots, 25 pears, 50 peaches and 200 apple stocks (for grafting) were planted out in the orchards, taking the place of worthless trees removed.

It has been my endeavour in replanting to make more compact blocks of trees of the same variety, and to remodel the orchards as far as possible, putting them on a more commercial basis. There is yet much of this work to be done, and it can only be effected as a gradual process during these lean years.

The usual course of practical instruction to the students has been carried out during the year, and a parallel course of lectures have been given at the School.

Experiments in spraying were carried out with Leaver's tobacco dip for Woolly Aphis, the results being satisfactory, and, as I understand the cost compares favourably with other remedies, this easily-prepared Colonial dip is to be recommended for this class of spraying.

The leaf rusts on pears, etc., have not been so severe as last year, but to make up this, *Puccinia Pruni* has been very bad, freckling the leaves with light yellow spots, which, growing into small pustules, have half defoliated many peach trees early in the season. This disease is very prevalent, and the Weenen trees also suffered badly. I notice that the common yellow peach is highly susceptible. Some varieties seem practically immune from attack, but I cannot at present make any definite statement in this connection.

From an orchardist's point of view, the fruit fly was responsible for an enormous amount of misdirected energy, and the percentage of affected fruit must have been considerably higher than in previous seasons. A

RESULTS OF MANURE EXPERIMENTS.

WESTERN ORCHARD.

1ST YEAR'S BEARING.

C.X.F. CEDARA.

Manures applied for 3 years.

Sections = Area $\frac{1}{2}$ Acre. = 112 Trees per Acre.

Manures applied per acre	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	lbs oz		lbs oz	lbs oz	lbs oz		lbs oz	lbs oz	lbs oz		lbs oz	lbs oz	lbs oz		
Sulphate of Ammonia ..	92 12 3 3	No Manure.					195 0 6 6	195 0 6 6	195 0 6 6	No Manure.					No Manure.
Nitrate of Soda ..	...	...	...	...	...	No Manure.					...	...	...	No Manure.	
" Potash ..	...	...	...	...	...	No Manure.					...	...	...	No Manure.	
Super. Ordinary ..	92 12 3 3	195 0 6 6	279 14 9 9	133 0 4 7	370 2 4 3 1	No Manure.					133 0 4 7	...	...	No Manure.	
" Double ..	...	...	...	...	...	No Manure.					...	...	...	No Manure.	
Basic Slag ..	...	...	...	...	...	No Manure.					...	...	...	No Manure.	
Bone Dust ..	...	...	...	...	...	No Manure.					...	...	...	No Manure.	
Potash Chloride ..	30 12 1 09	61 10 2 1	92 8 3 3	61 10 2 1	61 10 2 1	No Manure.					...	...	...	No Manure.	
Slaked Lime ..	...	...	...	...	...	No Manure.					...	...	...	No Manure.	
Gypsum ..	...	...	...	...	...	No Manure.					...	...	...	No Manure.	
Stable Manure ..	...	...	...	...	...	No Manure.					...	...	...	No Manure.	
Soils ..	fair	fair	v. poor v.	poor v.	poor v.	poor v.	poor v.	poor v.	poor v.	poor v.	poor	fair	fair	fair	
Fruit gathered—	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz
PLUMS—															
(Actual) 4 trees ...	41 6	14 10	10 11	3 9	6 10	2 10	2 6	3 10	2 6	3 9	3 13	8 13	5 4	6 5	9 0
(Extended) 112 ,, (1 acre)	1158 0	402 0	291 0	93 0	178 0	66 0	62 4	94 0	62 0	93 0	97 0	237 0	144 0	173 0	252 0
PEACHES—															
(Actual) 4 trees ...	82 5	37 11	31 10	37 3	40 0	22 0	60 0	48 0	48 5	40 2	29 0	96 1	94 0	55 2	41 5
(Extended) 112 ,, (1 acre)	2304 0	1047 0	178 0	1039 0	1120 0	616 0	1682 0	1344 0	1349 0	1122 0	812 0	2689 0	2632 0	1342 0	1153 0
Total actual lbs.	123 11	52 5	42 5	40 12	46 10	24 10	62 8	51 10	50 11	43 11	32 13	104 14	99 4	61 7	50 0
Total per 2 acres lbs. ...	3462 0	1449 0	1169 0	1132 0	1298 0	682 0	1744 0	1438 0	1411 0	1215 0	909 0	2926 0	2776 0	1715 0	1405 0

NOTE Figures in italics denote in lbs. and decimals amount of manure applied per 4 Trees.

WESTERN ORCHARD. MANURE EXPERIMENTS. C.X.F. CEDARA.
1ST YEAR'S RESULTS. Manures applied for 3 years.

Manures applied per acre.												
16	17	18	19	20	21	22	23	24	25	26	27	
lbs oz	lbs oz	lbs oz	No Manure			lbs oz	No Manure.			lbs oz	No Manure.	
...	...	...	...	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs o	...	...
236 14	114 2	114 2	...	195 0	195 0	195 0	195 0	195 0	195 0	...	...
8 4	4 07	4 07	...	6 6	6 6	6 6	6 6	6 6	6 6	...	...
195 0	84 0	84 0	...	...	...	...	...	...	...	...	...
6 6	...	...	...	...	...	...	...	...	...	...	...
...	77 0	77 0	...	...	...	...	...	...	...	...	...
...	2 7	2 7	...	...	...	...	...	...	...	...	...
...	
...	
...	61 10	61 10	...	61 10	61 10	61 10	61 10	61 10	61 10	...	...
...	2 1	2 1	...	2 1	2 1	2 1	2 1	2 1	2 1	...	...
...	...	...	...	616 0	...	...	...	...	...	...	...
...	...	...	...	22	306 10	...	...	...	...	...	...
...	...	...	...	...	10 9	...	...	...	...	12348 0	fair
...	...	...	...	...	...	...	...	...	...	4 1	fair
...	good	good	good	good	v. fair	v. fair	fair	fair	fair	fair	fair	
lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	lbs oz	
105 2	82 0	67 0	81 8	130 8	52 10	39 7	12 14	14 13	12 6	12 6	11 6	
2942 0	2296 0	1876 0	2276 0	3648 0	1466 0	847 0	350 0	405 0	340 0	340 0	314 0	
...	
71 13	107 8	107 0	53 6	64 3	119 8	94 8	60 4	74 0	70 10	80 0	42 1	
2001 0	3004 0	2996 0	1490 0	1795 0	3340 0	2640 0	1684 0	2072 0	1970 0	2240 0	1177 0	
...	
176 15	189 8	174 0	134 14	194 11	172 2	124 15	73 2	88 13	83 0	92 6	53 7	
4943 0	5300 0	4872 0	3766 0	5443 0	4806 0	3487 0	2034 0	2477 0	2310 0	2580 0	1491 0	
...	

NOTE.—Figures in italics denote in lbs. and decimals, amount of manure applied per 4 Trees.

large number of small, bright tins containing paraffin were attached to the trees in order to trap the flies, but the results hardly justify the trouble; the tins are too deep and not sufficiently wide to be very effective. Experiments prove that a shallower white dish containing a sweet-poisoned bait is more attractive to the fly, but, where heavy summer rainfall occurs, great difficulty is experienced in carrying out such trapping measures. The strawberries were also troubled by flies of other species.

A small evaporator was imported for use in the orchard. The output this year was not large as, owing to pressure of other work at the time, I was unable to give all the attention desirable to this work. After the machine was brought into working order, the dried fruit turned out towards the end of the season was satisfactory, the peaches especially being bright and clean looking, and were infinitely superior to the sun-dried fruit. Various types of Japanese plums were dried; the Satsuma plum appears to be most suitable. I am of opinion that there is a large opening for this class of manufacture in the Colony, as even the inferior fruit can be turned to some account, and the importation of large quantities of dried fruit could be checked.

For the packing of fruit a large number of wattle-wood boxes were purchased, and were found satisfactory for local dispatch. The prices for these boxes are considerably less than for imported wood, the chief objection to their use being the extra weight. If, however, a railway concession could be made, for charging by the cubic foot for larger consignments, it would probably have the effect of increasing the demand.

Three years ago experiments were made in the treatment of hail-barked trees, consisting of cutting back a number of trees to ground level, and allowing them to re-start. On examining the trees this year it is found that all trees treated in this way are in a far less forward condition than others that were simply left and hand-pruned in the ordinary way; a dressing of paint is advised where trees have been badly barked.

Strawberries have again given very satisfactory crops, the season commencing a month earlier than the previous year. No manure was applied to the beds.

On the manure plots no additional manure was added with the exception of plot 5, which was again treated with a dressing of lime (1,000 lbs. per acre); the effect of which has been to place the plot at the head of the list. I append hereunder comparative tables of this and last year's results. The yields throughout are seen to be much heavier, partially accounted for by increase of plants in the rows, and the evident residual values of various manures.

SEASON 1907-1908.						
No. of Plot.	Lines.	Distance apart.	When Planted.	Manure.	Area.	Yield. lbs. ozs.
3	4	12 x 36	4-4-06	N.P.K., Lime	·035	44 8
4	4	do	do	N.P.K.	·035	35 9
6	4	do	do	Basic slag	·035	34 7
5	4	do	do	Lime	·035	34 1
1	4	do	do	Stable	·035	32 0
2	4	do	do	P.	·035	30 6
SEASON 1908-1909.						
5	4	12 x 36	4-4-06	Lime	·035	62 0
6	4	do	do	Basic Slag	·035	57 8
3	4	do	do	N.P.K., Lime	·035	56 11
4	4	do	do	N.P.K.	·035	55 3
2	4	do	do	P.	·035	46 3
1	4	do	do	Stable	·035	38 9
N. = Nitrate of Soda				...	150 lbs. per acre	
P. = Superphosphate				...	300 lbs. per acre	
K. = Muriate of Potash				...	150 lbs. per acre	
Lime				...	1,000 lbs. per acre	
Stable				...	15 tons per acre	

One hundred olive trees of different varieties have been imported from France, which, arriving in fair condition, have been planted out in the Western Orchard, and will be subjected to a series of manure tests. At the time of writing the trees have for the most part commenced to sprout.

Persimmons.—A few fruit have for the first time been borne (variety Dia Dia Maru, a fine, large, yellow fruit, but with poor flavour).

The Persimmon is a fruit well worthy of more attention on the part of fruit-growers, as it is hardy and troubled with few diseases. I hope to report more fully on the different varieties next season.

The year's growth with apples has been very satisfactory; many of the trees commenced bearing for the first time, with a few apples on each, and these samples have been excellent. I consider the proposition of apple export from Natal well worth entertaining, and in reference to this I would mention that over 200 varieties of apples are growing at Cedara (which number I have increased by change of cuttings this year), including, with few exceptions, all the well-known export varieties of all countries. I would hope next year to place on exhibition a large display of apples, and to report more fully on the different varieties. Suitable apples for drying will also be selected.

From this season's results the following apples were particularly fine:—Bismarks, Ribston Pippin, Scarlet Pearmain, Rhode Isle Greening, Cellene and Cleopatra.

Peaches.—Fruits have been numerous and well formed, but fruit-fly

has been very destructive. As mentioned last year, the variety Dr. Hogg seems little troubled with black spot, and clean fruit again this year confirms that report. Of others, the "Early Rivers," a large, white-fleshed peach, was quite free from the fungus, which should make it valuable for planting, but I only have the one year's observation to go by. The same also may be said of the "Early Crawford," and I trust that next year results will confirm this apparent immunity.

Apricots.—The trees failed to bear, although small crops might have been expected.

Experiments have been undertaken with reference to the fruiting of these:—

1. By ploughing close up to the trees, while in full leaf, thus cutting back some of the roots, and checking the tree, which should tend to fruitfulness.

2. By heavy summer pruning.

3. By leaving trees unpruned.

Japanese Plums need little or no comment; heavy crops were borne by the older trees. I received the highest praise from Johannesburg with reference to Wickson plums.

Revenue for the year, including value of fruit supplied to the School of Agriculture, amounts to about £105, as compared with £71 all told last year. The revenue practically balances money expended on unskilled labour, which is satisfactory.

No loss to stock has been sustained throughout the year.

WEENEN ORCHARD.

The Orchard has been well cared for, and the trees for the most part have made remarkable growth. Weenen might well become the Orchard of Natal, growing choice fresh fruit, while at the same time the industries of jam-making, canning and drying could be set up. Hailstorms, however, unfortunately, are prevalent in the district. The fruit there, although subjected to two storms this year, recovered in a remarkable manner, and, with apples especially, one would never have supposed that they had been in any way injured.

Citrus fruits are looking well and commencing to bear.

The vines bore heavily, but only wine varieties have been planted, Hermitage being especially good. I think it would be as well to transplant some of the varieties from Cedara, as vines are doing no good at the latter centre.

Some very fine figs were produced. Grosseverte was probably the best.

A few almonds were borne, and I look forward with interest to the development of these trees.

Apples promise well for the future, and, among others, some excellent Nonpareil Russets and Rome Beauties were grown.

Apricot trees bore fair crops, and are in every way superior to those grown at Cedara. The well-known variety "Royal" was perhaps the best, and is a useful variety both for market and canning.

The apricot season here opens early, and compares with the earliest districts of Cape Colony.

The Weenen peaches were also very good, "Elberta" being of remarkable size, two of the fruits weighing 24 ozs. The peaches, "Mamie Ross," from pruned trees, were also fine, averaging 8 ozs. each, while others of the same variety, picked from unpruned trees, only scaled 3 ozs., which is a fair argument, if argument be necessary, in favour of pruning.

WINKEL SPRUIT ORCHARD.

The deciduous trees have been removed, and planted in a more favourable position. The trees, after replanting, are doing as well as might be expected.

Citrus trees for the most part are coming away well, and are looking healthy, and some trees have commenced fruiting. The proposed additional three acres to be planted will not only add to the value of the Experiment Station, but also will be found to be of considerable importance and assistance to the School.

SCHOOL OF AGRICULTURE AND FORESTRY.

The House Master, Mr. C. Williams, B.A., furnishes a brief account of work and recreation at the School during the month of April:—

At the beginning of the month there were 41 students on the College register, but two new students came into residence in the course of the month and one left to take up an appointment, leaving 42 on the books on April 30th. Of this number, four were pursuing their studies at Weenen and two at Winkel Spruit.

The Easter Holidays extended from April 8th till the 12th, and most of the students took advantage of the break in the work to go home or to visit friends.

Owing to the transfer of Mr. Mitchell from Cedara to Winkel Spruit, the course of lectures on "Apiculture" has been discontinued for the present. With the exception of the break at Easter, the other courses have been delivered regularly.

The system of drainage in connection with the College is to be further extended, on the recommendation of Dr. Buntine, the Medical Adviser, and I hope to be able to report the completion of the undertaking in my next report.

As regards the recreative side of the students' life here, I have to report that a tennis tournament was held in the course of the month, the winners in the final round being Messrs. Aard and Mason. On the evening of the 29th a smoking concert was held under the auspices of

the Sports Club, over which Student Jamieson presided. A very pleasant evening was spent.

CHEMICAL LABORATORY.

The Chemist, Mr. W. R. S. Ladell, A.S.C., F.C.S., who assumed appointment at Cedara on 23rd March, as Agricultural Chemist and Lecturer in Agricultural Chemistry at the School, reports that upwards of twenty samples were received and examined in the month of April. These included soils, phosphatic rocks, wattle barks, fertilisers and rubbers. The soils all showed the usual deficiency in phosphoric acid and presented no noteworthy features. The phosphatic rocks were rather disappointing on the whole, most of them showing only a small percentage of phosphate. The wattle barks were mostly of a high standard, containing over 30 per cent. of tannins. It would be more satisfactory to the buyers if all wattle bark was bought on the results of analysis, for the tannin content varies considerably in different samples of bark. The rubbers were samples collected in Zululand and in the Thornton district. The investigation of these is not yet complete.

A commencement has been made with an investigation of the soils from two areas of the same veld, one of which has been burnt regularly and the other left unburnt, both having been grazed by cattle.

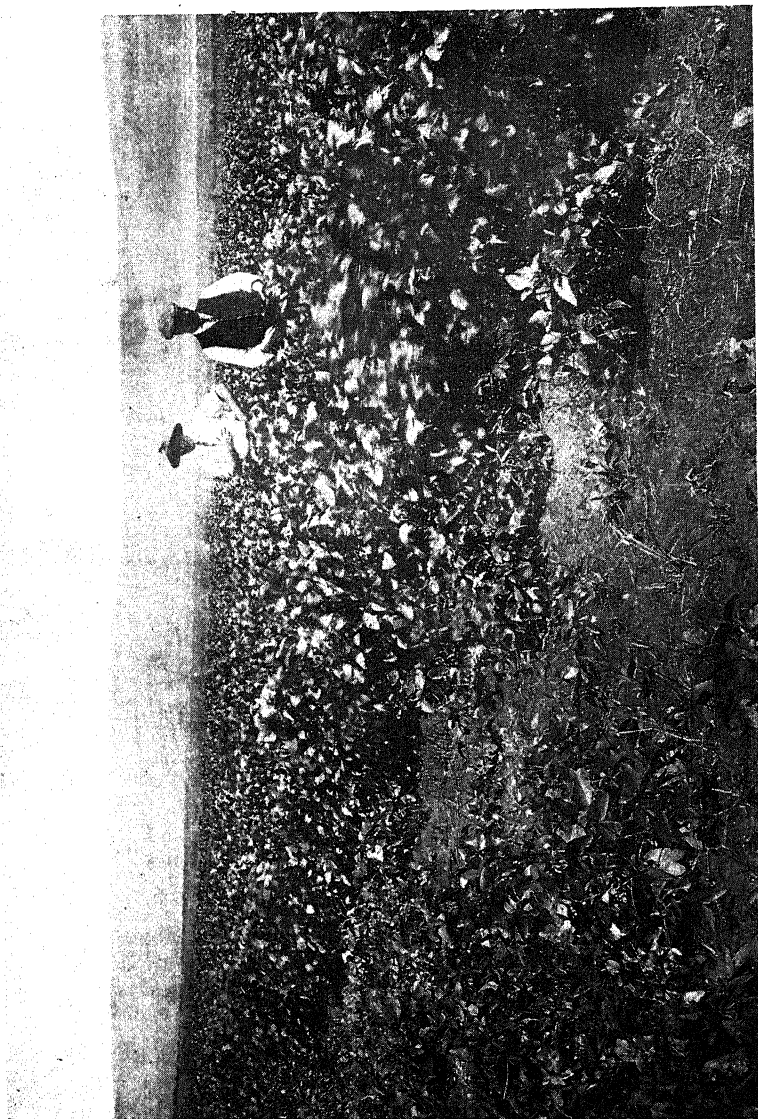
FOREST CONSERVATION.

The Chief Forest Officer, Mr. G. H. Davies, furnishes the following account of the month's work in Crown forests:—

The protection of forests from fire by burning off the old grass near wooded edges is usually more easily done in April than during any other month; and Foresters Moller (Normandien), Foster (Ngomi), Vanderwagen (Entumeni), report work of the kind, while others, presumably, have not neglected this duty. The burning of fire-belts round bushes, through grass of last season's growth, is another matter, and one which requires assistance and drier weather: the current month of May should see most of it completed. Forester Ball states that the trek-farmers of the O.R.C. are burning for winter veld in Natal near the Berg, and Forester Symons has been doing the same at Giant's Castle for the eland in the Game Reserve.

The fencing of certain Demarcated Crown Forests and Native Locations, rendered necessary by the action of E.C. Fever Advisory Boards, must prove useful in controlling the native wood-cutters. This has necessitated the cutting of some boundary lines passing through bush, a work that has to be done in other cases. Forester Chilvers is re-clearing the old lines at Ingeli—last done about sixteen years ago—and there are lines at Ngomi that have never been cut at all. Papers are being sent up to you regarding the latter.

Natal forests are plentifully supplied with lianes or "monkey-rope,"



VIEWS AT CEDARA.—III.

A fine field of Soy Beans.

which, on the rare occasions of sales, have to be classed as wattles under the tariff of Proclamation 58, 1903. They are used by wild natives for various purposes, but it is only recently I came across articles of civilised use made out of them by a mission-taught native at Umzinto. A few days ago I bought chairs and a table of a pretty rustic fashion made of this material and a few boards—obviously from packing-cases. The lianes had been peeled and varnished, and their striated surfaces have a pleasing effect, suitable for verandah, summer-house, and garden furniture. Made by European workmen, articles worthy of parlour use could be produced from this material, combined with panels from our handsome native timber: yellowwood, assegai, stinkwood (Cape oak), and others.

Some of our lianes may prove to yield rubber; of which reports and samples have been sent you by Forester Foster from Ngomi. Forester Gryspeert complains that the certain sources of supply of rubber are not properly exploited at Maputa, but he should await results of new arrangements. In his April report—just to hand in time for this—he strongly advocates the planting by the Department of South American rubber trees, especially *Castilloa elastica*, as certain to thrive at Maputa. He has had, I believe, considerable experience in Central and South America, and should now be well acquainted with the capabilities of Maputaland.

The revenue from timber has slightly revived, but I hear that ox-transport is being suspended in Alfred County as it has been in Ixopo. The East Coast Fever is, like a grass-fire, when apparently beaten out, liable to smoulder and flare up again unexpectedly, Forester Tarboton reporting a recent outbreak amongst working oxen at Empangeni. He has also lost his horse from sickness and proposes to buy another, which seems to me decidedly inadvisable in such a locality. Wattles are now much in demand for building of native store-huts for mealies, 226 bundles being cut—free of charge—in the Entumeni bushes alone. Forester Chilvers reports that the Ingeli Wattle Plantation is recovering from the recent heavy thinning. Forester Fernando has sold some of the Emkazeni thinnings—now too dry to serve as wattles—as dry fuel. The latter reports that yellow-wood seed will be plentiful this year, and recommends the cultivation of the wild gardinea, known as “Kafir Cherry,” for ornamental purposes and its scented flowers.

It is somewhat surprising that the prevailing forest offence should be, according to Forester Fernando, the stealing of firewood. The price has been reduced by one-half, which should have the effect of making the game not so worth while as it was; but possibly to “the native mind” that very reduction is a proof that we have no right to make any charge at all. Concessions to a servile race will only be gratefully received as flung to it by the caprice of an arbitrary potentate: from a Government, in the interests of the governed, they are merely confessions of previous

injustice. The fines imposed during the month for Ingwangwane Forest Station alone, for stealing firewood only, amounts to over £8, without counting many cases postponed because the offenders sent kraal-heads as proxies to appear in their place—an innovation in criminal procedure worthy of the “native mind.”

Foresters Cruickshanks and Eyles are investigating cases of clearance of bush to make gardens in Alexandra and Alfred Counties respectively. This is a perfectly monstrous offence, but, based upon agricultural ideas ingrained in the native, it has been allowed by owners of natural forest who wished to retain labour and rent. It is time that the essential wickedness and selfishness of this crime against the commonweal be amply and publicly set forth by severity of punishment on conviction. As I have often shown, no plantations make up for loss of natural bush with its centuries-old humus and humus soil beneath slowly-growing trees that conserve far more water than they transpire.

Incidentally, Forester Eyles inquires if there is no fund from which informers can be rewarded—he having had to pay a man who put him on the track of one of the above cases. I fear that he must be answered in the negative, though forestry cases are well fitted for such a system, which would economically assist the conservation of large wild areas inadequately policed. Forester Cruickshank caught ten natives hunting in Crown forest in Alexandra during the month, and they were fined each £3. At Qudeni, in Nkandhla Division, Zululand, Forester Household has reason to fear that a good deal of close-season hunting is surreptitiously carried on by natives. When I was in immediate charge of those forests natives were forbidden to carry assegais at all except when hunting, with the result that they could only be seen with them in the shooting season, and even then only in, or on the way to, the bush. I often disarmed natives myself, and believe that my native guards did so in more cases than they ever reported. Mr. Household now complains that men prowl about the bush with assegais in the close season, and that he cannot stop them doing so as, in a case tried in April, the offender went unpunished though he had assaulted the forest-guard who interfered with him. Prowling about bush with assegais is “hunting,” and a duly-appointed forest-guard is a “constable” under the special protection of the law when on duty.

Reports from forest stations everywhere show that game is plentiful for the season now commenced. In the Giant's Castle Reserve the eland are scattered as usual at this time of year, and some have strayed on to the adjoining farms. Forester Symons inspected Bushman's Pass and other places on the 7th and 8th April, and is satisfied that no eland can get through. His vermin-traps, unfortunately, caught a couple of buck—an oribi and a vaal-rhebok—besides weazles, wild and pole-cats, etc.

As the Ngomi native tenants are reported to be, in some cases, able

but unwilling to pay arrears of rent, I have instructed Forester Foster to sue a few of them to encourage the others. Crops are promising in their gardens, and work plentiful; and to allow a greater accumulation of arrears is but to lay up trouble for the future.

AFFORESTATION.

The Chief Afforestation Officer, Mr. F. S. Stayner, submits the following report on the work of his department during the preceding month:—

April is the wane of the afforestation year except where large timber is in process of realisation; and the operations which can be successfully carried out narrow down considerably.

Planting of *A. melanoxylon* (Blackwood) along the Boston Road margin of the main plantation has been continued, and all the trees available in the nursery have been used up for this purpose. In any case the onset of the dry season would have prevented further extension in this direction. Felling of alternative lines in the Home *Eucalyptus* Arboretum has proceeded, the *E. leucosylon* (Victorian Iron Bark), *E. siderosylon* (True Iron Bark), and *E. melliodora* (Yellow Box) sections have been so treated, the quantity of timber now on hand is far beyond the requirements of the Farm, and the excess amount is available for sale or for supply to Government departments needing fuel.

The season's wattle planting was concluded at the end of last month, and I am able to report excellent results; the main portion was done by students of the School. A thorough inspection of the plantations and belts of wattles situate on the Central Experiment Farm has been made, and stripping should be commenced in earnest next year. I estimate that revenue to the extent of £1,000 will be made from bark at this centre and a considerable sum accrue to the Treasury annually henceforth from this source. Stripping will augment the quantity of firewood available. In the Nursery considerable trouble has been experienced from caterpillars among the indigenous plants. Transplants of indigenous trees now on hand comprise:—*Myrsine melanophloeos*, the "Cape Beech," Isiquane wi-hlati; *Millettia caffra*, Umzimbeet; *Ochna arborea*, "Cape Plane," Umtelele; *Celastrus peduncularis*, "Blackwood," Umnquai; *Curtisia faginea*, "Assegai Wood," Ungxina; *Schottia brachypetalata*, Um-Xamo; *Podocarpus Thunbergii*, "Yellowwood," Umsunti; *Gardenia Rothmanni*, "Candlewood," Nelegengane; *Kiggelaria Dregeana*, "Wild Peach," Isikali; *Zanthoxylon capense*, "Knobwood," Umnungu-mabele; *Xylosma monospora*, "Lemonwood," U-veto; *Calodendron capense*, "Cape Chestnut," Umbaba.

It is the last three that have been devastated mostly, and it is curious to note that these species are the prevailing ones in the natural bush situate upon the Farm and the forests in proximity to it.

Temperatures registered during the month have ruled high, except on the night of the 30th, when the mercury touched freezing point. In May the main work will be the burning of fire breaks around the boundaries to protect the plantations, but integral work will not be possible with the present labour allowance. The trees struck and fired by lightning during January in the sugar gum plantation testify eloquently as to what may happen if the internal breaks are not made.

Of the seed received from India in December of last year, a nice batch of *Cedrus deodara* has been raised, and *Juniperus excelsa* is just beginning to germinate. The seed of *Taxus baccata* has been eaten by rats and that of *Corylus colurna* by the coolies, who evidently understand the edible nature of the latter and have unearthed all the nuts that were sown. The next batch of this seed received will be well coated with arsenic before planting.

WINKEL SPRUIT.

In the course of his report for the month of April, the Acting Manager, Mr. W. C. Mitchell, furnishes the results of experiments with ground-nuts and nitro-bacterine as applied to Natal yellow beans:—

GROUND-NUTS.

Ground-nuts have been harvested except a small area planted late and which had not quite matured. The yields were very satisfactory, but it would appear that manuring ground-nuts on this soil is not a paying proposition, as the heaviest yield in the manure experiment plots, *viz.*, 4,050 lbs. per acre, was obtained from an unmanured plot, and the third highest yield, *viz.*, 3,825 lbs. per acre, was also unmanured, whilst a yield of only 25 lbs per acre more than this was obtained with a dressing of 300 lbs. superphosphate per acre.

NITRO-BACTERINE.

Two small sections of Natal yellow beans were harvested, half of each section having been treated with nitro-bacterine. One section was on sandy hill soil and the other in the vlel. Of these the former carried a few root-nodules on the treated half, and gave a yield of clean seed at the rate of 1,050 lbs. per acre, whilst the uninoculated portion gave a crop of 684 lbs. seed per acre. In the vlel the yields were 1,009 lbs. and 927 lbs. per acre respectively, no nodules being visible. In neither instance was the crop manured.

Results of Inoculation Experiment with Kidney Beans.

Variety: Natal yellow. All plots, .22 acre.

Section A. In flat, in deciduous orchard.

Section B. On hill, above Fourcroevea section.

Both sections planted January 25th, 1909.

Section A. Harvested 8th and 9th April.

Uninoculated, 687 lbs. gross, 204 lbs. grain, equals 927 lbs. grain per acre.

Inoculated, 729 lbs. gross, 222 lbs. grain, equals 1,0009 lbs. grain per acre.

(No nodules visible.)

Section B. Harvested 16th April, 1909.

Uninoculated, 336 lbs. gross, 150 lbs. grain, equals 684 lbs. grain per acre.

Inoculated, 550 lbs. gross, 231 lbs. grain, equals 1,050 lbs. grain per acre.

(A few nodules.)

Grain produced from the treated section appeared of slightly better quality than the other.

Maize Husks for Fruit Packing.

A large proportion of the maize crop has been harvested and is being husked in the covered crib. All the white, inner leaves of the husk are being baled and forwarded to Durban in wool-packs for the N.F.G.A. as fruit packing

THE APIARY.

The Chief Field Instructor, Mr. W. C. Mitchell, who has undertaken the organisation and management of a commercial apiary at Cedara in connection with a course of lectures on bee-keeping, delivered at the School, forwards his first annual report in this connection:—

In spite of several set-backs and a few troubles which have tended to considerably reduce the net returns, I am pleased to be able to give a very satisfactory report on the past season.

When the apiary was first started a site was chosen to the north of, and abutting on, the Farm Manager's garden. This location proved unsuitable, owing to being some little distance from my house. I was unable to give the hives the constant supervision that they needed, and considerable extra work was involved in carrying appliances backwards and forwards to the apiary. Ants were a very great nuisance, and clearly demonstrated that small colonies must be provided with an ant-proof stand; four weak colonies (purchased from A. A. Rafter) swarmed out from this cause. Four hives became queenless during the year owing to virgins returning to their wrong hives.

During March the apiary was moved to a very much more convenient, cleaner and sheltered situation at the back of my house, and I feel confident that this branch of the Farm will give very satisfactory returns in future years. The past season has, I think, proved that, with favourable bee pasturage such as we enjoy and with suitable cropping on our cultivated areas, bee-keeping will be quite a paying proposition on a commercial scale. It is worth noting that two of my hives which had their supers cleaned out on March 23rd gave me a fur-

ther 40 lbs. on honey nine days later, from a Buckwheat flow! At the depot price of the S.A.B.K. Association, this 40lbs. of honey is worth £5, less expense of marketing. Such figures are very satisfactory indeed, and I might add that one of these two hives has to-day (6.4.09) a further 12 or 15 lbs. in the top storey.

The year's results so far (1st April) are:—Increase from 4 colonies to 11. Revenue to date, £4 13s. 9d. Stock on hand, 70 lbs. of light honey.

E. R. SAWER,

Director, Division of Agriculture and Forestry.

Central Experiment Farm, Cedara,

20th April, 1909.

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

A WHEY butter factory is, according to the *Live Stock Journal*, the latest development in the United States. The factory itself has been erected at St. Lawrence, New York, and during the past season has been receiving the separated whey cream from twenty-five other cheese factories. The experience gained is that about 4 lbs. of whey butter can be made from every 1,000 lbs. of whey, and that this utilisation of the whey solves the problem of the loss of fat in cheesemaking. Where the butter has been put on the market its fine flavour has made it very popular, so that it obtains the same price as the finest creamery butter. As a result of selling the separated whey cream the cheese factories have been able to make rather more than a penny more for every 100 lb. of milk; while the separated whey is said to lose none of its value for pig-feeding.

Manuring Potatoes.

Some very useful points on the manuring of potatoes are published in the *Mark Lane Express Agricultural Journal* of the 15th February. The potato crop requires a liberal supply of plant food, and a proportion of this nourishment should be in a soluble form, as the plant grows rapidly, and has a root system that feeds near the surface of the soil. So far as the crop itself is solely concerned, a very liberal supply of good farmyard manure is an ideal dressing, but a farmer has to think

of his other crops, and especially of his pocket. However, while excessive applications are not to be recommended on the score of expense, it is bad policy to be stingy with the farmyard manure, because the potato plant does not thrive so well unless it can feed during the whole period of its growth on organic material. It is this fact that causes high-class Peruvian guano to be such a favourite with potato growers.

There seems no doubt that the best system is a combination of farmyard manure and commercial fertilisers. The fertilisers being quickly soluble furnish nourishment in the early stage of growth, and the organic manure keeps up a steady supply during the later stages. If, for any reason, sufficient farmyard manure is not available, then it should be replaced in part by a dressing of good Peruvian guano, which is also an organic manure, capable of keeping up a regular supply of nourishment. It is sometimes argued that it is not necessary to incur the expense of artificial potash except on sandy soils. This is correct when farmyard manure is used in quantities of 25 to 30 tons; the writer endeavours to show that such large dressings are extravagant, and when the dressings are limited to 12 or 15 tons, then he considers it a mistake to omit potash with such a potash-loving plant. The form of potash should be sulphate of potash in preference to kainit or muriate of potash, in both of which the chlorides are apt to act with bad effect on the quality of the tubers.

In addition to the moderate dressing of farmyard manure, the potato crop should have the benefit of 4 to 5 per cent. of complete manure, or a soluble Peruvian guano containing about: 6 to 7 per cent. of ammonia, 15 to 20 per cent. of soluble phosphate, 5 to 6 per cent. of potash. If the soil is decidedly sandy the potash should be increased from 8 to 10 per cent. The complete manure to be sown in the drills before the seed is planted.

Light and Growth.

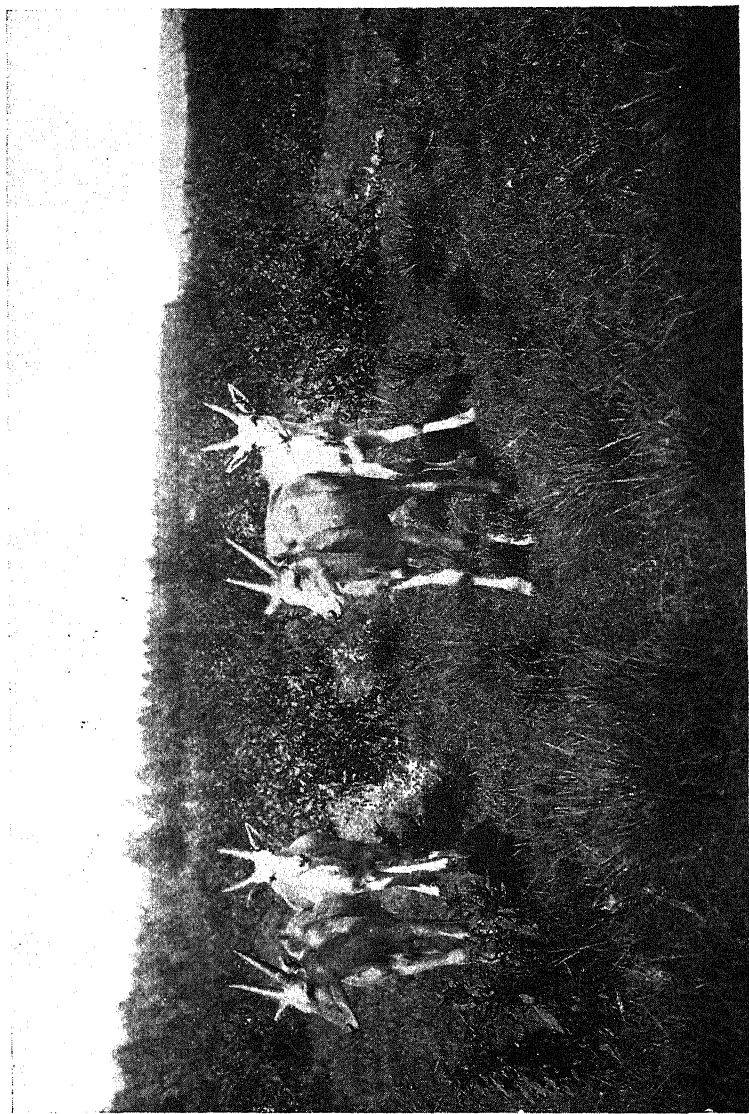
Many years' observations have led to the belief that store cattle, especially young store cattle, make less growth in December and January than in any other period of the year. When February comes in growth can easily be noted, but not so during the preceding months—at least, that is the writer's experience. Others, too, have noticed the same thing in their cattle. When asked to account for it, one practical farmer remarked that it was the good keep that was beginning to tell on them. This is no doubt the simplest explanation, but it does not apply in every case. There are some cattle that are kept in good condition and well fed all the year, and yet these seem to be as liable to suspend growth for a

period in mid-winter as those that have been favoured. "Only a day or two ago I looked into a box, warm and comfortable, containing three young beasts. They had been well cared for, not only during the present winter, but previously. Yet growth of late has been scarcely observable. They are cattle that have never had a check, and they should have been growing steadily all the time. Some may account for this want of progress by saying that the weather is colder, that more food is required to keep the body at its normal heat, and that this is why less growth is made. This theory, like the preceding one, does not fit every case. There are cattle that are kept as warm in winter as in autumn or spring, but they do not form exceptions or exhibit steady growth.

"Is it possible there is any connection between this want of progress and the amount of daylight? We are told that plants grow much quicker under the direct rays of the sun than in semi-darkness, and that under the electric light they can be made to grow by night as well as by day, and thus make much more than ordinary progress. If this is correct, it may be that animals are subject to the same influence, and grow more slowly in the two darkest months of the year for want of daylight. If there is any foundation for this theory, which at any rate fits all the circumstances better than any other, it would seem desirable to give cattle—that is, growing cattle and breeding cattle, as distinguished from fat cattle—as much light as possible. This may be done either by getting them into the open or lighting their byres by means of glass tiles and windows, so as to obviate, as far as natural circumstances will allow, the ill effects of continued semi-darkness."—*Live Stock Journal*.

Manuring of Maize.

The Essex Education Committee instituted this experiment in view of the importance of this forage crop as a source of green feed during the late summer months when fodder is scarce, and was carried out on five farms. The dry period which was experienced just when the plants needed moisture resulted in such poor growth on the light soils at two centres that no estimate of the yields was made. On the heavier soils of the three remaining centres, the rainfall was insufficient to allow the manures to produce their full effect, and in consequence little or no reliance can be placed upon the results. It is considered, however, that the following conclusions can be drawn with safety:—(1) That a supplementary dressing of 1 cwt. nitrate of soda to 12 tons of dung will increase the crop; (2) that superphosphate and potash will not materially increase the yield; (3) that in a dry season leaving out farmyard manure and increasing the nitrate will not give such good results as a dressing of dung and an artificial supplement.



VIEWS AT CEDARA.—IV.

Some of the Eland.

Buying of Canes on the Analysis of the Juice.

In the April issue of the *International Sugar Journal*, Mr. J. Lely gives some very useful information on the buying of canes on the analysis of the juice. He states that a common objection against the central factory, Gunthorpe's, in Antigua, is that estates producing superior canes do not get the full benefit of such canes. This is certainly true, but no estate produces only superior or inferior canes. In order to meet this objection canes may be bought on the analysis of the first mill juice taken from a crusher or first mill roller. Mr. Lely recommends the following scheme to be adopted:—Not counting the first year's very short grinding season, the average sucrose content and purity of the first mill juice has been (with little variation for each year) respectively 18·50 and 91. For these canes has been paid four and a half per cent, of sugar plus bonus out of the profits. Assuming the possible maximum of sucrose content to be 25 per cent., and the possible maximum of purity to be 100, the recovery is equivalent to sucrose percentage multiplied by actual purity and divided by maximum purity (100). The theoretical maximum price, which it is never possible to attain, is

$$\frac{25}{18\cdot50} \times \frac{100}{91} \times 4\cdot5 = 6\cdot6 \text{ per cent. of sugar + bonus.}$$

where 18·50 is the actual sucrose percentage of the canes received by the Gunthorpe's factory and 91 the actual purity.

The value of canes is now calculated as follows:—

$$\frac{\text{Actual sucrose p.c. (18·50)}}{25} \times \frac{\text{Actual Purity (91)}}{100} \times 6\cdot6 \text{ p.c. of sugar + bonus}$$

When the bonus amounts to 2 per cent. of sugar, the inferior canes will realise in total 5·103 per cent. of sugar, the superior canes 7·46 per cent. This standard would give full benefit for superior canes and full disadvantage for inferior canes. Drying out does not affect the total value of the sugar in the cane, for what is lost in weight is gained in sucrose content, and *vice versa*. The analyses for each estate are entered in a ledger, and the fortnightly average is used to calculate the value of the canes delivered during that period.

Manuring of Lucerne.

In the December number of the *Journal of the Board of Agriculture*, the results of certain experiments which were carried out, with a view to ascertaining the best manures to be used for lucerne, are mentioned. Experiments were carried out at the East Suffolk County Council Experiment Station at Bramford and Saxmundham; at Bramford they were made in the six years 1895—1900, and at Saxmundham they were begun

in 1903 and are being continued. They show that the lucerne crop is particularly dependent for success upon abundant supplies of both phosphates and potash in the soil, and that if either of these be deficient (as was potash at Bramford and phosphates at Saxmundham), a satisfactory crop cannot be expected until manures are applied. Further, these experiments show very distinctly that the right manure for one soil may be the wrong manure for another, and, in growing lucerne, farmers ought to ascertain by trial what manure the crop needs. The following simple trial is suggested:—Mark off four plots of one-twentieth of an acre. To plot 1 apply nothing; to plot 2 apply 20 lbs. of superphosphate and 10 lbs. of nitrate of soda; to plot 3, 20 lbs. of superphosphate only; to plot 4, 10 lbs. of nitrate of potash only. The crop will soon show whether one or both of these manures should be employed in growing lucerne. It may be noted that at Bramford the best relative result (61 cwt. of hay per acre) on the average of six years (12 cuttings) has been obtained on the plot receiving 1 cwt. muriate of potash, though the plot receiving 2 cwts. nitrate of soda, 2 cwts. superphosphate, and 1 cwt. muriate of potash has yielded 62 cwts. At Saxmundham, on the average of four years (8 cuttings), the best results (67 cwts.) was got from a plot receiving 2 cwts. superphosphate and 1 cwt. muriate of potash, while the plot receiving 2 cwts. nitrate of soda in addition has yielded only 60 cwts.

Experiments were also conducted at Woburn for six years, and various manures were applied in 1902, 1903, 1904, and 1906, nothing being given in 1905 and 1907. The heaviest yield (green fodder) from three cuttings (19 tons 16 cwts.) was obtained from the plot receiving 4 cwts. superphosphate, 4 cwts. bone dust, 4 cwts. sulphate of potash, and 2 cwts. nitrate of soda per acre. The best of the remaining plots (17 tons 9 cwts.) received similar manures except that 2 cwts. sulphate of ammonia was substituted for the nitrate of soda. The unmanured plot produced 11 tons 6 cwts., while applications of phosphates, potash, or nitrogen alone either gave no increase or seemed actually to result in a diminished yield.

Cattle-Feeding Experiment.

A cattle-feeding experiment has been conducted by the Florida Agricultural Experiment Station for the purpose of securing information on the following points:—(1) What combination of our feeds will give the best results for beef production; (2) what will be the cost of producing a pound of grain; (3) how long a feeding period is required to fatten Florida-grown cattle for the local market; (4) what average daily gain in weight should the Florida feeder expect.

The following important facts arrived at are published in Bulletin No. 96 of the Florida Agricultural Experiment Station:—(1) Florida farmers can produce good beef with Florida-grown feeds; beef can be produced practically as cheaply in Florida as elsewhere; (3) the feeding period required to fatten cattle in Florida is shorter than in the Northern States; (4) the average daily gain that may be obtained in Florida by proper methods of feeding is larger than the Northern feeder can expect; (5) a combination of mealies, velvet beans in the pod, and some roughage (such as cotton-seed hulls, crab-grass, hay, or sorghum hay), with a nutritive ratio of 1.6 or 1.7, will give best results. (By nutritive ratio is meant the ratio between digestible protein and carbohydrates; thus, a feed containing one pound of digestible protein to six pounds of digestible carbohydrates would have a nutritive ratio of 1.6.) (6) To make cattle-feeding profitable we must use well-bred bulls of the beef breeds.

Reviews of Books.

AN AFRICAN PEOPLE.

THE BAWENDA OF THE SPELONKEN; A Contribution towards the Psychology and Folklore of African Peoples. By R. Wessmann, Spelonken, Transvaal Colony. Translated from the German Original Text by Leo Weinthal, F.R.G.S., Chief Editor of *The African World*, London, etc. London: *The African World*, Ltd.; Cape Town and Durban: J. C. Juta & Co. Price 3s.

THE African native is always interesting, and our interest in him must increase rather than diminish as the years roll by. He furnishes the bulk of our labour, and, incidentally, the bulk of our trouble. He is a useful man, but often a troublesome one. Some farmers, seeing only the less lovely side of his character, have always hard things to say about him; other farmers, who appreciate honesty, physical strength, temperance, loyalty, and such virtues praiseworthy in a servant, look upon the native as a useful factor in South African progress. His very ubiquity makes him one of our chief and most troublesome problems, but it is his very ubiquity also that makes him a factor of considerable economic importance. So, at least, it appears to us. We are not blind to the native's faults, but we nevertheless see in him one of the Colony's stepping-stones to prosperity. The native is essentially an agriculturist. He may not be a good agriculturist: he may, indeed, be, as he is, a

wasteful agriculturist; but he has the agricultural instinct, nevertheless. That instinct must be encouraged; the native must be taught the rudiments of agricultural science; then we shall make him an important factor in the development of the Colony. But however we regard the matter, he is here—and here in his millions—and so we must accept him. If we regard it as “a bad job,” then we must make the best of a bad job, and, like wise people, help him, so that in years to come he will help himself and help us.

Since the native is with us, and is likely to remain, we must study him, study the psychology of his race, understand his customs, learn all we can about his past, so that we may be the more fitted to legislate wisely for him, to mete out justice to him as nearly in accordance with his ideas of justice as our own ideas will allow, to treat him sympathetically, and so to fit him for his place as a child-citizen (if we may use the expression) of South Africa.

Every contribution to a study of the South African native, then, is to be heartily welcomed. However it might have been written, we think we should have welcomed the appearance of Mr. Wessmann's book, anyway, from the very fact of its being a contribution towards the study of “the psychology and folk-lore of African peoples”; but as it is we welcome it doubly, not only as such a contribution but as a worthy addition to South African literature. We confess the perusal of it has delighted us, and we only wish there were more such books on the South African natives.

But let us hasten to explain who the Bawenda are, since the name is perhaps not familiar to most Natalians. The Bawenda tribe, which comprises about one-third of the entire population of the Zoutpansberg district of our northern neighbour, was the last Transvaal tribe to surrender its independence. “The tribe's terrain is the whole of the rugged mountain country between the Levubu and the Limpopo rivers.”

The Bawenda (we read) are probably only a part of a greater tribe whose dwellings are looked for on the Congo, where, according to the oldest Portuguese maps, a people of the same name is still living. As the Matebele separated from King Chaka, and after their trek through the Transvaal settled in Rhodesia, so must the Bawenda have (during wars) migrated to the South.

The Bawenda appear to be very much like the natives of Natal and Zululand, except in a few minor points. Many of the apparent differences are due to the closer contact our natives have had with the whites, which have resulted in the elimination of many savage practices and even, perhaps, of some savage instincts. The environment generally of the Bawenda has been different, and this difference has had its effect upon them.

This is a book that we would like to dwell upon. There is so much in it of interest to the Natalian—to the student of native races as well as to the general reader—that we would like to examine the book in

detail, and see the points of resemblance and difference between these interesting Northern Transvaal natives and the Zulus and Natal Kafirs. This is a matter, however, which we must leave to the individual reader; and we can promise him much food for reflection in the course of his perusal of Mr. Wessmann's book.

To Mr. Weinthal, the translator, a few words of praise are due. His part in the production of this book leaves nothing to be desired. What Mr. Wessmann has written charmingly and with a charming sequence of ideas, in German, Mr. Weinthal has converted into a charming contribution to South African literature—for, although Mr. Weinthal is not himself (so far as we are aware) a South African, his interest in this country is necessarily great as editor of *The African World*.

There are a considerable number of excellently reproduced photographs, many of which are in themselves works of art; and the book itself is a handy octavo volume of just over 150 pages. It is a book we can honestly recommend, particularly to South African readers, but also to all students of ethnology and African folk-lore. The book is being published in South Africa by Messrs. J. C. Juta & Co.

FARMING EXPERIENCE.

TALKS WITH NATAL FARMERS. By the *Natal Witness* Travelling Commissioner (Sydney Yorke Ford). First Series. Reprinted from the "Farmers' Day" columns in the *Natal Witness*. Pietermaritzburg: P. Davis & Sons. 1909. Price 1s. 6d.

Progress in farming rests upon a two-fold foundation: luck and experience. He who depends solely upon the chances of good luck is doomed to early failure; whilst it is he who bases his practice upon experience who makes substantial progress. Three-fourths of the mistakes in farming are due to want of experience. When we speak of "experience" we do not wish to be understood to mean *personal* experience—that is to say, experience on the part of the farmer himself. What we here mean by "experience" is *all* practical experience, whether it be one's own or anybody else's. To know how So-and-so, who is a farmer who has "got on," does this or that, what Somebody-else feeds his young chicks, what success another progressive man has had with his silo and what crops he used for it, how still another farmer irrigates his lucerne: this knowledge it is that helps on the struggling farmer, and especially the young farmer who is just starting for himself. Experience is necessary for success in farming, but it does not matter very much whether it is your own individual experience or somebody else's, so long as you know what to do under any given circumstances. You must, that is to say, make other men's experience your own experience, for practical purposes. It is this idea which lies at the base of the system of "interviewing."

The journalist actually visits the farmers themselves, learns their experiences and views, and incorporates the information he has so received in an article for his journal. This is a much-favoured system of publishing the actual experiences of progressive farmers, and it is certainly about the best method there is.

When the Editor of the *Natal Witness* conceived the idea of sending out a representative to interview leading farmers of the Colony, he performed a signal service on behalf of our farmers; and the issue by Messrs. P. Davis & Sons of the first series of these "interviews" in book form is a matter for congratulation in view of the value of the interviews themselves and the handy form for reference in which they are thus presented. They have now become a valuable farmer's book which should be in the hands of everyone in the Colony who is "on the land." In their issue in book form they have derived additional value from the fact that they are now classified according to districts: we have interviews, for instance, with farmers "In the Howick District," "Around Maritzburg," "Round about Richmond," "Towards Greytown," and "Beyond Greytown"—53 "interviews" in all, divided into five districts. In this way, a farmer living in any of these districts has only to turn to the "interviews" with farmers in his district to learn their experiences and practices in order to get some idea as to what has been found best by leading farmers in his district; and at the same time he can profit by the experience of farmers in other districts as well.

These "interviews" reveal many divergent practices in connection with the various processes of the wattle-bark industry. The opinions expressed, both in this connection and with regard to such matters as the distance of planting of mealies, the introduction of catch-crops, etc., are often contradicting, but we have on the other hand, in marked contrast, "the almost unbroken pæan of praise sent forth by those who have experimented with the recently-introduced perennial fodder grass, *Paspalum dilatatum*," as the interviewer (Mr. Sydney Yorke Ford) himself says in the introduction to the book, the equally high terms in which lucerne is spoken of by a few who have successfully cultivated it, the favourable opinions expressed as to the value of ensilage. The farmers interviewed who have made a special study of live stock communicate some valuable particulars regarding their experience of calving and lambing seasons, of the treatment of various stock diseases, and of the numerous other problems associated with this large subject. Many, also, describe feeding and other farm devices worthy of imitation; others have something to say about agricultural implements and machines; and others again record their experiences of manuring and irrigation, of the innumerable pests with which the Natal farmer has to contend, and a host of similar interesting subjects.

It is a book which will be found to contain a lot of useful matter and advice, and we recommend it to the perusal of Natal farmers.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

DURBAN AND COAST POULTRY CLUB.

The following report was submitted by the Secretary of the Durban and Coast Poultry Club at the annual general meeting held recently:—

I have much pleasure in submitting to you the eleventh annual report of the Durban and Coast Poultry Club. We were fortunate in inducing Mr. Wallis Short, to once again accept the presidency, and I am certain I am voicing the sentiments of all the members of this Club when I say the strong position we find ourselves in to-day is due to his successful leadership.

ANNUAL SHOW

It will be remembered at the last annual meeting the late President referred to the arrangement that had been made with the Durban and Coast Society of Agriculture and Industry, to again hold our show in conjunction with theirs, and mentioned that instead of an extra gate being charged, as in the previous year—a system that was much resented by the public—an agreement had been made whereby the Agricultural Society would give us a lump sum in lieu of gate money. The arrangement was fully justified, for, apart from the financial results, the attendance of the public at the exhibition was quite unprecedented, and at times the shed room proved totally inadequate for the inrush of visitors. Notwithstanding the prevailing depression, the prize fund was increased by liberal donations from members of the Club and outside friends, and to them the best thanks of the Club are due. The arrangements for the show were all that could be desired, owing to the assiduous work of Mr. Albert Drew and an efficient yard committee. The Club is also greatly indebted to Mr. J. F. Pearce for his untiring energy, and the great assistance he rendered, by the loan of a gang of his Natives gratis, which saved the Club considerable outlay. I would also like to tender my thanks to Mr. T. N. Price for his work in connection with the assistant secretarial duties of the show. Coming to the exhibits, there was a slight falling off in the total number of entries, compared with the previous show, the decrease being in fancy pigeons and cage birds. Homer classes showed an appreciable increase, while poultry was almost identical in number with the 1907 exhibition. This was most gratifying, considering there were only three entries in poultry from outside the Colony, while at the previous show the entries in this section were considerably augmented by a large contingent from Kimberley and other centres outside Natal. The falling off in cage birds was no doubt due to the unsuitable accommodation provided for this class of stock, and I think the incoming com-

mittee will do well to take this matter into consideration when making arrangements for the next annual show. The drop in fancy pigeons is to be regretted, as these birds have always formed a most pleasant section of our exhibitions, but owing to the climatic conditions it has been found that these birds do not do so well on the coast. No doubt if Maritzburg and Howick—where some of the finest stock in South Africa in fancy varieties are kept—could be induced to send us larger entries for our next show, it would be an immense assistance, and it is for this reason I would not recommend cutting down the classes to any great extent. On behalf of the Club I would also like to place on record the valuable services rendered by the judges, Messrs. F. A. Smart, F. Chapman, H. Clarkson, J. Large, H. Cope and W. H. Røyston, also the numerous stewards and sub-committees who assisted in the necessary arrangements. A feature of the show was the smoothness with which everything worked, which no doubt was due to the energetic committee and staff, and I am also pleased to report that with the assistance of the hon. treasurer (Mr. S. Wayne), who has always lent a willing hand to facilitate the work of this department), we were able to pay out the prize money within a fortnight after the show. Before passing on I would like to express appreciation of the courteous manner in which the Club were treated by the Agricultural Society, who met us in every possible way.

FINANCIAL.

The financial side of the Club for the past year or two has been a source of concern to the management, but I am pleased to be able to report that we are once again on the right side, and the balance sheet which follows gives ample proof that the Club is in a very sound condition.

We have been able during the past year to discharge all our liabilities, including an amount due to the Dickinson Charity Fund of £26 16s. 10d., and other old payments such as engraving of trophies, etc. This has been brought about principally by the success of the show, which, through the inauguration of the new prize scheme, gave us a profit, and then, aided by an increased membership, we have gradually strengthened our position. It may be mentioned that the Club will be without Government grant this year.

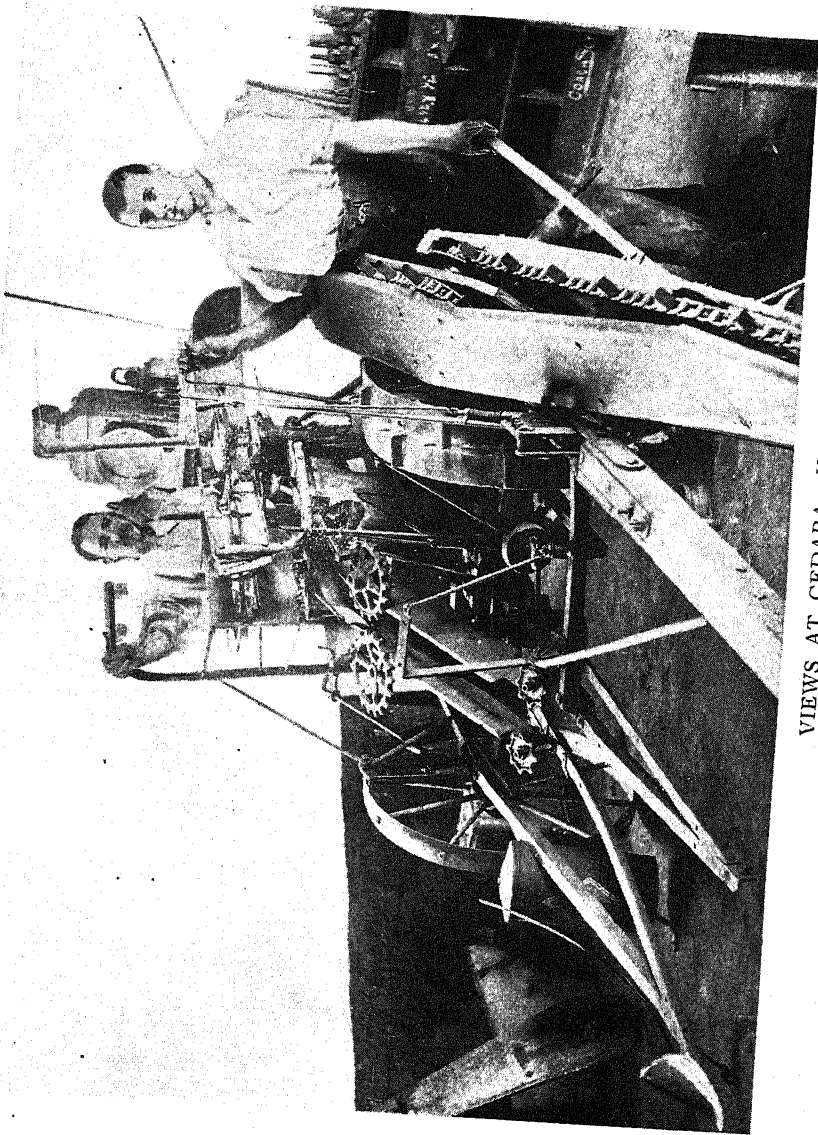
GENERAL.

The membership at the end of 1908 stood at 81, and at the conclusion of the Club's 1907-8 year 127, showing an increase of 46.

Many new members have been proposed for the present year, and only two resignations received, so we can confidently anticipate being even in a better position at the conclusion of 1909.

The homing section of the Club has made considerable progress and is now working on a better footing. A special report will be presented by the secretary of this section.

There is one other matter I would like to bring before this meeting.



VIEWS AT CEDARA.—V.

The McCormick Meal-Harvester.

and that is the necessity of the Club giving more tangible evidence of its existence in the interim between the annual exhibitions, and I am certain if the committee take up the idea of having "one day" shows for the more popular breeds of poultry, and an exhibition of, say, fancy pigeons and cage birds, and another for homers, they will do much to stimulate interest in these fancies and popularise the Club to a very marked extent.

I cannot close this report without tendering my thanks to the president, treasurer, and outgoing committee, also the chairman and committee of the homing section, all of whom have been willing to lend assistance whenever required.

MID-ILLOVO.

ON the 17th April the Mid-Illovo Farmers' Club held its annual meeting in the Mid-Illovo Hall, but the Chairman's report arrived too late for insertion in our last issue.

The following gentlemen were present:—Messrs. L. G. Wingfield-Stratford, J.P. (chairman), B. B. Evans (vice-chairman), H. S. Power, J.P., J. H. McCullough, J.P., Joseph Ballam, W. A. McCullough, R. A. Cockburn, W. Ballam, D. B. Evans, W. E. Antel, M. A. Cockburn, P. H. Woolley, G. B. Evans, Jos. McCullough (hon. treasurer), A. L. Wingfield, J. W. V. Montgomery (hon. secretary), and Rev. H. H. Hanham (hon. chaplain).

The Chairman delivered the following address:—

Gentlemen,—In reviewing the work done in the past year, both by the club, and in the district, I wish in the first instance to draw your attention to the paucity of members, only 37 at the end of the year; we are now adding to that number four new members. I regret to state that there are a good number of defaulters, which, I think, the Club should take notice of. I wish to ask these members if they think it is fit to leave the burden and expense of the Club on those who consider it a matter of honour, to pay up at once. I may suggest that if everyone did so, it might be possible to reduce the subscription, especially if the Club was more liberally supported. During the year there has been only one resignation, but I regret to say, one loss by death, and that of a member who can ill be spared; I allude to the late Mr. S. E. Large, manager of the South African Plantations. He was one who took great interest in the welfare of the district, not in a negative form, but by his active support. On the social side, too, he was also to the fore. He was a staunch member of the Club, and considered (as all should) that it was a necessity to the welfare of the district that every farmer should join. To return to the present membership, I ask, gentlemen, if you do not think the number disgraceful in a go-a-head district, a district so progressive that they have claimed the right to support a railway. If farmers will only look at it from a proper standpoint, they will see the good the Club

has done in looking after their interests, and surely it is only fair they should become members and so help to increase the prosperity of the district, which is well worth supporting. I should also like to see our meetings better attended. We have held our usual monthly meetings regularly, but I am sorry to say that in the majority of cases the attendance has been very poor, and once or twice not even a full quorum. Besides the above there has been two public meetings under the auspices of the Club. At one of our monthly meetings a Mr. Chadwick attended and addressed us on the matter of growing beetroot for sugar. It was considered too soon to put in a big acreage, as transport would kill it, but small plots might be put in to test the growth and percentage of sugar in the beet grown here. At present the movers in the matter have abandoned the idea of starting a manufactory near Pietermaritzburg; still the idea is worth keeping in mind, for when we get our railway, if beetroot could be grown in payable quantities both for farmer and manufacturer, we might see another industry started in our midst. The two public meetings were held to consider the Draft Convention for the Union of South Africa. At the first our senior M.L.A. addressed the meeting; and at the second, Mr. Hyslop, M.L.A., one of the delegates to the Conference, and I am sure the club is grateful to both gentlemen for their most interesting speeches. Although this has more to do with politics than farming, if a false move was made, it would seriously affect us as farmers, so I hope everyone will study the question closely, so that, when the time comes for them to vote, they will give a right answer. Everyone will own, Union means strength, Isolation weakness, but are we buying Union at too great a price. Personally, I think not, especially if we can safeguard our province.

Re our railway, we have got a step nearer the goal; the line has been surveyed and pegged out, and only the money is required to commence operations. I hope this will be forthcoming and the line started. During the year, the Club sent two deputations to the Government. They were received very courteously, and informed, in the first instance, that a Bill was being brought in to enable the Government to build the railway at once. This Bill was, unfortunately, counted out. The second deputation was informed that this Bill would be reintroduced in the next regular Session. With regard to the bridge over the Umlazi River, I hope that will soon be put in hand, to be ready before the next rainy season. Its erection has been delayed, as the Government wished to build the rail and road bridge together, for which they have a vote of £2,000. Now that our railway seems so close, we should give the Government and Parliament every inducement to build the line, by an increase of energy in putting more acreage under cultivation, so as to make the railway a success from the start. I am glad to record an increase this year of one-fifth more land under cultivation in mealies alone; 700 acres have

been planted in wattles in Beaumont, besides 2,000 acres in other parts of the district, and more land is being broken up in the district for next year's crops. This is encouraging, but we must not stop there, as the line will be able to carry the produce of every acre we can spare to cultivate. You have now, through the help of the Government, a payable market in England for mealies, so I hope pride will prevent you from letting our railway sceptics boast, "I told you so," by its becoming another burden on the State by lack of energy. The land at any rate will not be to blame, as you have one of the finest districts in Natal. Six weeks ago the mealie crop promised to be a record one, but owing to excessive rains, top grub, and the "Army Worm," it has been considerably reduced. Notwithstanding this, there will be an average of over six muids an acre, and with the increase of acreage we should be able to export more than last year. The top grub seems to be developing into a plague, and something ought to be done before it increases to such an extent as to endanger the growth of mealies. A resolution on this matter was sent to the Agricultural Union by our Club, and I hope the matter will be thoroughly sifted. I don't think the "Army Worm" has done the mealies any harm; they are more destructive to lucerne and forage. We had them about 30 years ago, and they disappeared as suddenly as they appeared, which I hope will be the case this time.

The cut-worm was a great pest this year, fields having to be planted two or three times, owing to the havoc they played. If we harvested our mealies as the Americans do, by shocking, and, on removal of crop, ploughing up the land at once, and again if necessary before the rains, we should then get rid of this scourge, or anyhow keep it under, and it might help to destroy top grub. I don't think, on the whole, farmers will have much to complain of; though "John Bull" must grumble at something; and I think this year it should not be at the crops, but the want of cheap transport. If only we could have got the railway built as far as this side of the Umlazi to Cleveland Hill, it would have helped us considerably. As it is, owing to East Coast Fever having broken out in our quarantine area, the roads have been closed to ox transport, and I am afraid a good number of farmers will have to hire, and, being a long distance from the station, this may prove rather expensive work. Although the stoppage of ox transport is hampering us, it may turn out a blessing in disguise; no doubt you will disagree with me, but I have always considered this mode of transport a danger to the Colony, for it has been the cause of most of our woes; the grand source of spreading disease. If it could be permanently stopped, we should get used to mules, and in time wonder how we did without them. Of course, one of the reasons is, the expense. You have to feed the mule, and don't the ox, but against that you have quick despatch, and no fear of spreading disease. An unfed mule is a feeble creature, compared with the ox. If

oxen were fed and kept in good condition, I don't think he would contract disease so easily, but the trek oxen is generally overworked and under-fed, and then in a fit state to catch any disease flying about, and so pass it on to healthy ones; this is only the law of Nature. Again, the ox is wanted on the farm, and if in course of time he was ousted by the horse or mule it would mean the improvement of the beast, by better stock being kept, and the farmer breeding for dairy and slaughter purposes, which are useless for the road, just as the trek ox is no good for slaughter. Another source of danger of infection, which is gradually being got rid of, is the open veld. Every farmer should go in for fencing, not only to keep out disease, but to rid farmers of ticks. Dipping is absolutely useless till ox transport is stopped and farms fenced. I do not mean you should not dip or clean cattle now, but there is no hope of getting rid of the pest till fencing is universal; it will even then take some years. You cannot expect well-bred cattle to live and thrive till ticks are eradicated.

I have alluded casually to Tick Fever, but I think very seriously about it, and I hope farmers, for their own safety, will keep their cattle isolated, especially from Native herds, and fence their farms; herd boys are not to be trusted. I only hope in the near future some serum will be found to act as a preventative and so save the healthy stock left in the Colony. Your Advisory Boards are doing their best to keep back the disease, but they can do little unless they get your undivided support and you take every precaution yourself.

There is one industry I have not yet mentioned. Although last, it is of great importance, and I hope will develop into a prosperous concern, I allude to tobacco. We have proved we can grow first-class tobacco for cigars and cheroots; it only now remains to be made a permanency. Cigars and cheroots grown in the Beaumont postal district have got a good name in many parts of South Africa. If this industry develops, and a central factory be started, it will pay farmers to learn how to grow tobacco and cure it. They will find out that tobacco pays better than mealies. In closing, I beg to thank members of the Club for the support they have given it in the past year, and I wish especially to thank the hon. secretary and the assistant hon. secretary for the work they have done. I thank you again, gentlemen, for the honour you have done me in the past.

The accounts having been presented by the hon. treasurer, and audited and passed, the election of officers for the ensuing year then took place. Mr. H. S. Power, J.P., was unanimously elected chairman, all other officers being re-elected. Several members expressed gratitude and thanks to the retiring chairman, Mr. L. G. Wingfield-Stratford, for the tasteful and courteous way in which he had carried out the duties of the chair during his long term of office.

Correspondence.

** * Correspondence is invited on topics of interest to farmers. Letters should be written on one side of the paper only; and while a nom-de-plume may be used, all letters must be accompanied by the name and address of writer. The Editor is not responsible for the opinions of his correspondents: the letters which appear in these pages are published as the opinions of the respective writers, and their insertion does not necessarily imply editorial concurrence with the views expressed.*

THE SHEEP DIP CONTROVERSY.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In connection with the great sheep dip controversy, attention to which has been called at various times in your pages, the following letter from Mr. Moore, the well-known wool expert at Huddersfield, will probably prove of great interest to farmers generally throughout the country, as it throws a great deal of new and interesting light upon a subject which has long agitated the farming community of South Africa.—Yours, etc.,

PRICE & SON.

Cape Town,

12th May, 1909.

The following is the letter referred to in the foregoing:—

DEAR SIRS,—Many thanks for so kindly sending me the newspaper cuttings, which I herewith return. The agitation against the dip (sulphur and soda) seems to be with you as it is here—manufactured and forced by those interested in proprietary dips. When I was in South Africa I was one day approached by a gentleman who said "you will be asked questions at to-day's meeting about dips and will be shown sheep dipped in the lime and sulphur solution. If you denounce it and find the wool injured by it, it will be made worth your while." I reported the incident at the time to the Hon. the Director of Agriculture. I have never either asked or received any fee from the Government or anyone else for any reports or recommendations I have made or for any services I have rendered. Can the "newspaper experts" who have written against me say the same? I had not seen the letter in the *Financier* until you sent me the cutting from the *Cape Times*, but the writer gives his whole case away at the outset in saying that he could tell as soon as he saw the

fleeces that on account of their tenderness, brittleness and harshness they had been injured in dipping. From my own observation, I defy any man living to tell from the appearance which fleeces have been dipped and which have not, provided always that a sufficient period of time has elapsed between dipping and shearing. If the writer in the *Financier* had only a tithe of the knowledge of wool which he assumes, he would know that the faults he detected in the fleeces can be put down to other causes and to nothing more likely than an impoverished condition of the animal as a result of scab. I should not be surprised to learn that this is the expert who found traces of injury in fleeces which had never been near the dip.

Everything depends upon the time when the sheep are dipped, and I am of opinion that if this be done soon after shearing, say, not later than three months after shearing, but the earlier the better, it will be impossible for anyone either chemically or any other way to discover any injury. On the contrary, if the scab is destroyed by reason of the dipping the gain is incalculable.

The writer in the *Financier* makes much of the resolution of the Bradford Chamber of Commerce against the soda and sulphur dip, but he does not say that out of nearly 200 invitations issued to those interested to attend a special meeting, only about half-a-dozen thought the matter of sufficient importance to turn up, and amongst them I did not notice a single buyer of Cape wool. One of the few present was the Managing Director of Messrs. Isaac Holden & Sons, the largest commission wool combers in the world, so I promptly sent him 40 bales O.R.C. greasy wool, all of which had been dipped, and asked him to take special notice in scouring to see if any difficulty presented itself. He reported that it was impossible to detect any difference in that respect between the 40 bales and the 140 bales Australian with which they were mixed. Since then the wool has gone through every process of manufacture and has been dyed, some of it into most delicate shades, but the report at every stage has been "perfectly satisfactory." One of the half-dozen present at the Bradford meeting, and he about the only one who handles South African wool, who supported the *Financier* correspondent when he moved the resolution of which he seems so proud, has now modified his opinion and does not see what injury can possibly result if the sheep has from nine to eleven months' exposure to sun and atmosphere after dipping and before shearing.

The agitation on this side is dying a natural death. Those really interested have satisfied themselves. What they want is the wool better grown, better got up and more of it. *Dip in what you like, they say, but get rid of scab.*—Yours, etc.,

T. H. MOORE.

COW SUCKING HER OWN MILK.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—We have a cow here that sucks her own milk. Can you, or any reader of the *Journal*, give me a remedy to cure her of this bad habit?—Yours, etc.,

J. L. ALLKINS.

Verulam.

[This can easily be prevented by using a headstall through the straps of which nails have been driven outwards. The cow will thus be prevented from reaching her udder on account of hurting herself with the nails, and she will soon be cured of the habit.—ED.]

LUCERNE.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Having read your magazine, and especially article on pig-feeding, in March number, if I may intrude on your generosity, I shall be glad if you can inform me *re* lucerne planting:

- (1) What is best time of season to plant;
- (2) What is the best way to sow;
- (3) Class of soil most suitable;
- (4) Is newly ploughed land (virgin) suitable without aid of fertilisers?

My farm is six miles off sea, soil varies, some places light sandy, others loamy and sandy brown, and the heavy black soil. I have a few pigs, and would be glad to try a small patch of lucerne as a trial after reading your valuable magazine.

I should have enclosed subscription for *Journal*, but cannot get in to-day to obtain postal order, but will post it first opportunity.

Can you give me Secretary's address of the Farmers' Union, as I wish also to become a member.

I have 150 acres under mealies now, but planted very late, as I had to rely on the steam plough, which did not reach me till end of December. As a consequence, I lost the season for cane and must do all I can to get in as much as possible this year.

Hoping I am not troubling you too much seeking for information,—Yours, etc.,

A. C. HUNDLEY.

Chiselhurst, Amatikulu.

[Lucerne may be planted either in the spring or in the autumn; if you intend sowing this autumn you should put in your seed at once. See that your ground is well pulverised and in good tilth before sowing,

in order to have a good seed-bed, this being very essential for lucerne. There are two methods of sowing—broadcast and in drills, both of which methods have their advocates. The advantages are, everything considered, supposed to be equal, but we think that you would do better to sow in drills than broadcast, for these reasons, namely: that you will be better able to keep down weeds—for there are sure to be patches, in the broadcasting method, where the seed has failed to germinate, and which will be a constant source of trouble to you on account of the weeds—and you will be better able to conserve the moisture in the soil by mulching the surface after rain has fallen. If you broadcast you will require about 20 lbs. of seed to the acre; if you sow in drills 15 lbs. will be sufficient. The drills should be about 21 inches apart. The seed should not be covered to a depth of more than half an inch, else the young plants will be unable to force their way up to the surface. You might sow on the *surface* of the ground without any covering to the seed at all. The writer himself has obtained good results by this method of sowing. Only sow this way, however, in good weather. Certainly virgin soil will carry lucerne well without the aid of any fertilisers; but make sure that there is no clay or shale near the surface, otherwise your lucerne may turn out a failure. Choose the deepest land you have, with a porous subsoil. Plough deeply and thoroughly. We hope to publish articles on lucerne-growing in the *Journal* shortly.—The secretary's name and address of the Natal Agricultural Union is Mr. D. M. Eadie, c.o Messrs. Duff, Eadie & Co., Timber Street, Maritzburg. This Union, however, consists of affiliated district agricultural societies, farmers' clubs, etc. What you should do, if you wish to become identified with the farmers' association movement, is to join one of the Zululand associations, such as the Empangeni and District Sugar Planters' and Farmers' Association (Secretary: Mr. F. Piccione, P.O., Empangeni), the Eshowe District Farmers' Association (Secretary: Mr. T. Parkins, Eshowe), the Zululand Farmers' Association (Secretary: Mr. R. H. McAlister, Melmoth), or the Zululand Coast Farmers' Association (Secretary: Mr. F. Brammage, Ginginhlovu).—ED.]

Never shout at a young horse while training him.

Marketing farm produce is almost as important as producing it. It frequently does not pay to be in too much of a hurry.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of April, 1909 :—

COLLIERY.	Average Labour Employed.					Output.
	Productive Work.			Unproductive Work.*	Tot.-l.	
	Above Ground.	Below Ground.	Total.			Tons. Cwt.
Natal Navigation ..	379	561	940	22	962	20,908 10
Elandslaagte ..	322	686	1,008	6	1,14	16,008 19
Dundee Coal Co. ..	300	446	746	—	746	13,024 1
Durban Navigation ..	219	497	716	—	716	11,741 0
South African ..	100	282	382	59	441	10,929 2
St. George's ..	214	412	626	11	637	10,793 13
Natal Cambrian ..	223	354	577	12	589	9,285 14
Talana... ..	156	411	567	28	595	8,060 1
Newcastle ..	86	412	498	—	498	6,193 9
Hlobane ..	87	216	303	29	332	5,133 13
Glencoe (Natal) ..	122	156	278	42	320	4,705 0
Natal Steam Coal Co. ..	85	202	287	18	305	4,364 0
Ramsay ..	97	195	292	—	292	3,179 15
West Lennoxton ..	53	97	150	—	150	1,518 0
Ballengeich ..	37	44	81	30	111	1,046 13
Hatting Spruit ..	48	53	101	38	139	958 3
Central ..	30	77	107	—	107	857 6
Zululand ..	18	16	34	—	34	248 0
Vryheid ..	8	8	16	—	16	50 0
Dundee Coal Co. (Burnside)	—	—	—	66	66	16 0
Totals ..	2,584	5,125	7,709	361	8,070	129,016 5
Corresponding month, '08	2,302	5,624	7,926	729	8,655	135,343 13

	Productive Work.			Unproductive Work.	Total, April, 1909.	Total, April, 1908.
	Above Ground.	Below Ground.	Total.			
Europeans ..	200	172	372	42	414	402
Natives ..	883	3,338	4,221	225	4,446	4,981
Indians ..	1,501	1,615	3,116	94	3,210	3,272

* Cost Charged to Capital Account. † February and March Returns. ‡ March Return.

Mines Department, Maritzburg, 7th May, 1909.

CHAS. J. GRAY,
Commissioner of Mines.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of April, 1909 :—

				Tons. Cwt.
Bunker Coal ..	..	..	..	59,814 9
Coal Exported ..	..	..	..	32,845 16
Total				92,660 5

Customs House, Port Natal, 1st May, 1909.

GEO. MAYSTON,
Collector of Customs.

Meteorological Returns.

Meteorological Observations taken at Govt. Stations for Month of April, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain in 1 day.		Total for Year from July 1st, 1908.	Total for same period from July 1st, 1907.	
	Maximum.	Minimum.					Fall.	Day.			
Observatory ..	79.9	63.6	88.7	54.6	2.27	13	1.01	5th	33.7	44.68	
Stanger ..	82.4	61.4	92	52	2.01	9	.91	4th	25.53	45.70	
Verulam ..	85.1	61.0	95	49	1.57	8	1.20	4th	31.22	41.77	
Greytown ..	78.1	47.4	88	32	1.99	7	1.29	4th	40.06	40.89	
Newcastle ..	80.1	52.0	88	38	1.37	2	1.00	13th	—	41.46	
Mid-Illovo ..	78.4	57.4	90	45	2.23	7	.83	5th	37.63	42.34	
Estcourt ..	80.9	49.7	88	30	.72	8	.32	5th	19.27	28.77	
Krantzkloof ..	80.3	60.4	92	50	1.87	9	1.25	5th	35.44	—	
Ixopo ..	—	—	—	—	2.91	8	1.67	5th	33.11	—	
Imbizana ..	80.3	60.0	91	48	1.56	8	.85	5th	35.71	48.23	
Port Shepstone ..	85.1	59.3	94	35	1.27	4	1.05	5th	35.95	45.52	
Umzinto ..	87.4	57.4	93	55	1.77	6	.98	4th	38.34	48.67	
Richmond ..	79.2	53.5	90	38	1.97	0	1.25	4th	48.63	42.25	
Maritzburg ..	80.6	53.7	92	37	2.52	9	1.35	4th	34.39	36.00	
Howick ..	79.6	49.3	92	31	1.64	7	.78	4th	37.27	38.54	
Ludysmith ..	84.4	51.7	92	40	.99	4	.75	4th	—	—	
Dundee ..	78.3	53.0	89	44	.76	2	.65	5th	33.45	31.15	
Weenen Gaol ..	87.7	48.8	95	35	.51	5	.30	4th	31.01	29.64	
Camerdown ..	82.1	55.2	95	44	1.49	5	1.10	4th	25.92	29.41	
Lidgerton ..	79.6	43.8	90	25	3.24	8	1.35	4th	40.43	—	
New Hanover ..	82.2	52.9	90	35	1.68	8	1.25	4th	37.94	42.28	
Krantzkop ..	85.1	69.5	91	53	1.29	5	.70	4th	30.76	—	
Charlestown ..	73.0	43.2	79	29	1.13	1	1.13	5th	43.89	50.39	
Nongoma ..	79.0	42.3	89	33	1.55	4	.75	5th	—	—	
Utrecht ..	79.4	29.1	85	20	1.48	4	1.20	5th	—	—	
Vryheid ..	79.7	52.3	88	45	1.02	4	.42	14th	—	37.65	
Mthuzini ..	82.2	62.3	87	50	5.56	5	3.90	4th	59.61	52.54	
Hiabisa ..	81.4	60.9	90	55	2.08	4	1.00	5th	—	32.53	
Melmoth ..	79.6	57.2	90	48	1.35	8	.58	5th	27.91	27.48	
Ubombo ..	80.1	59.3	89	52	.42	3	.25	29th	41.00	34.93	
Nqutu ..	74.2	49.6	84	37	.98	2	.58	21st	36.03	—	
Point ..	—	—	—	—	2.23	7	1.25	4th	35.47	54.97	
Umbogintwini ..	81.5	53.3	91	45	1.50	11	.84	5th	—	—	
Mahlabatini ..	82.4	46.4	94	39	.48	2	.38	4th	31.27	28.47	
Empangeni ..	82.8	60.5	94	50	3.27	7	2.01	4th	37.73	44.84	
Bulwer ..	—	—	—	—	3.85	13	1.56	4th	55.10	48.08	

Meteorological Observations taken at Private Stations for Month of April, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain- fall in 1 day.		Total for Year from 1st July, 1908.	Total for same period from July 1st, 1907.	
					Fall.	Day.			
Adamshurst	88	35	1.30	6	0.4	5th	—	—	
Hilton	87	33	1.71	8	0.9	4th	39.51	37.20	
P.M.B., Botanical Gardens	—	—	1.88	8	1.10	4 h	35.30	38.17	
Ottawa	—	—	1.73	8	1.00	5th	31.69	42.26	
Moun Edgecombe	—	—	—	—	—	—	—	—	
Corn blia	—	—	—	—	—	—	—	—	
Milkwood Kraal	—	—	—	—	—	—	—	—	
Blackbu n	—	—	—	—	—	—	—	—	
sac.harine	—	—	—	—	—	—	—	—	
Equeefa	92	53	1.49	8	1.03	5th	35.96	47.77	
Umzinto, Beneva	—	—	1.35	5	0.93	4th	35.63	52.61	
Umhlangeni	—	—	1.64	6	0.86	4th	—	—	
Harden Heights	—	—	—	—	—	—	—	—	
Reit V ei	—	—	1.63	7	0.57	4th	30.32	27.60	
Branxholme	—	—	3.02	10	1.46	5th	55.94	66.00	
Cedara—Hill Station	86	35	1.95	8	1.00	4 h	—	—	
„ Vlei Station	84	30	1.76	8	1.00	4th	—	32.41	
Winkel Spruit	88	49	1.61	7	0.94	4th	33.60	48.07	
Weenen	88.5	30	0.33	2	0.28	4th	—	—	
Giant's Castle	72.7	47.7	1.50	7	0.64	5th	49.44	29.64	

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	P. Nicholson ..	Boundary Slopes
		"	J. A. Groed ..	Aaiwana Hoek
		"	J. de Waal ..	Lombard's Kop
A. B. Koe ..	Portion of Estcourt	"	A. W. J. Hottingh ..	Kop'sagte
		"	M. & H. Hatting ..	Amatambo
		"	J. C. Potgieter ..	Potgietersdrift
		"	C. Blacker ..	Liefontein
A. C. Williams ..	Utrecht ..	"	H. A. Potgieter ..	Schuins Hoek
		"	C. Emmett ..	P. Itlick
		"	H. P. tgieter ..	Onverwacht
		"	P. Labuschagne ..	Witfulos
		"	N. Fourie ..	Langewacht
		"	G. T. van Rooyen ..	Groot Vlei
H. Van Rooyen ..	Batanango ..	"	Hengwene ..	Paardeplaat
		"	J. Doyer ..	Hart's Kamp
		"	Sege ..	Nonjariel
		"	Nqulube ..	Paarde Graf
		"	M. Delpont ..	Babanango
		"	konkone ..	Paarde Graf
		"	Ngogwene ..	"
L. Trenor ...	Alfred ..	Lungsickness	Sulwana ..	Location
		Scab	Yalwayo ..	"
		Lungsickness	Dumas ..	Location
		"	Uyimbi ..	Location
		"	Mlotshwa ..	Misingopansis Kraal
		"	M. Clothier ..	Slexcel
		"	E. M. Etheridge ..	Selhurst
		"	John Ryan ..	Norburg
		"	J. J. Oosthuis ..	The Gorge
		"	J. H. Payn ..	Burnside
		"	Byela's Kraal ..	T. Fynn's Location
		"	R. Fann ..	Blackwater
		"	F. Mzizi ..	Lot 1, Enquabeni
		"	E. Mzizi ..	Lot "F" Enquabeni
		"	J. T. Clothier ..	Whitecliff
		"	J. J. Oosthuis ..	Harding Town Lands
		"	Swenyas ..	Blackwater
		"	G. Larkan ..	Antioch
		"	Injongaved ..	Rydal Mount
		"	Mdingwas ..	Lot 3
		"	C. Knox ..	Knoxwood
		"	Sigumu ..	Lot F
		"	Ndhlankunzie's Kr	Location
		"	Noganes ..	Harding Gate
		"	Mncanca's Kraal ..	Mount Pleasant
		"	Bodhlaginis ..	No. 1 Location
		"	Mqumansia ..	Omega
		"	Spingaan ..	Hawarden
		"	P. Uibrecht ..	Luluku
		"	Jabula and Sonjela ..	Mount Pleasant
J. Ralfe ..	Lion's River ..	Scab	C. J. King ..	Lynedoch
		"	C. Strapp ..	Oatlands
		"	W. Adams ..	Atamshurst
C. T. Vaughan ..	Paulpietersburg ..	"	P. Allen ..	Welverdiend
		"	J. M. van Rooyen ..	Halberton
		"	Lucas van Rooyen ..	"
		"	P. van Rooyen ..	"
		"	C. M. Webb ..	Papkinvlei
		"	Jan van Rooyen ..	Halberton
		"	G. Dekker ..	Paardefontein
		"	H. Stadler ..	"
R. Wingfield Stratford	Newcastle ..	"	C. Mavuga ..	Koppie Allen
		"	G. W. Thomas ..	Lang's Nek
		"	C. M. Koch ..	Christian
		"	G. Waal ..	"
		"	D. A. Drummond ..	Bryon
C. E. Walker ..	Portion of Estcourt	"	J. A. V. Lindsay ..	Riverside
		"	F. H. Lindsay ..	Rosemount
		"	Natives ..	"
		"	Oates, W. E. ..	Oatesdale
		"	Henderson, A. ..	Malbrake Full

RETURN OF FARMS UNDER LICENCE (*Continued*).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
G. Daniell	Vryheid	Scab	M. Kunzwana	Vredehof
			W. F. Hein	Goedgelooft
			Mrs. Heynes	Brakpan
			A. de Lange	"
			J. Kruger	"
			F. Gunter	"
			P. Tradoux	"
			Ma' gulu	Hardbet'ald
			Mkelegana	"
			P. Swaats	Bloemendal
			C. Kritzingen	Vaalkrantz
			P. M. Bester	Leuwnek
			A. Steenkamp	Driekwart
			Mzinzati	Groenkop
			Kuyeze	Mooiplaatf
			Jantje	Trado
			Sguangene	Trado
			Velapi Zondi	Bedrog
			A. Zitu	Mooiplaats
			Mkitshwa	Vergelegen
J. R. Cooper	Nkandhla & Nqutu		H. Liversage	Nqudenl
E. Varty	Western Umvoti ..		U. R. C. Hardman ..	Wanstead
			W. R. J. van Rooyen ..	Rustenburg
			D. C. S. Nel	Highfield
			L. J. van Rooyen	Driefontein
			H. Hansmeyer	Onres
K. Ripley	Emtonjaneni		Yena	Govt. farm, No. 149
			Mangenga	Mfuli Mission Statn.
			Kehla	Crown Lands
			Megwedhla	Morgenzon
J. F. van Rensburg	Ng'atshe		H. Libetruu	Torliwewo-de
			Mfihlo	Weltervreden
			P. S. art	Rietfontein
			J. Potgieter	Kondelage
			A. C. Delpont	Wonderfontein
			J. Jacobitz	Zalfag'n
			Blekizane	Lisbon
			Mbumbo	Fresgewaent
			Getshu	Driefontein
J. Stewart	Bergville		Menu	Kleinwaterfall
E. W. Larkan	Umsinga		Amos Nahlovu	Nazareth
			Oyugulangans	Umsing
			Gogo	Somschoek
			Tabatula	Nazareth
			J. A. Clement	Pome:oy
			J. Westhuysen	"
			Avon Mdothu	Grootvlei
			Muhkwa	Somslock
			Gwambula	"
			Mkegenis	Gordon Memorial
			Nyonienweye	Mazabap
			George	Gordon Memori l
R. Mayne	Eastern Umvotian l		L. L. Nel	Maresdal
	Krantzkop		J. A. Nel	Welgegund
			J. Keyter	Elandskop
			J. T. Martens & ntw	Broedershoek
			Macalingani	Loots Hoek
			C. H. Have nann	Summerford.
E. W. Bowles	Ixopo		Ngevana	Arundel
			Bogyan	"
			Genisani	"
			Magewana	Klepat
			Nodwengw	"
			Ncopo	"
			Vuquza	"
			Putaza	"
			Nduba	Waverley
			Njunga	South Hills
			Makafana	Waverley
			Dumdum	Kolston
			Nqaye	Waverley
			Umenyana	Kolston
			Mancansika	"
			Unvakatshhe	"
			Umbabula	Iprisugval
			Kebe	Location No. 6

RETURN OF FARMS UNDER LICENCE (*Continued*).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
E. W. Bowles ..	Ixopo	Scab	Luzi	Location
		"	Sabexa	Springvale
		"	Janga	Location No. 6
		"	G. Way	Herdstone
		"	Njoyeta'a	Lot 29
		"	Thelwana	Lot 55
		"	Samtombi	Eme aId
		"	Gungatshi	Location No. 3
		"	G. Thomson	Valahalla
		"	G. H. Cooper	Avetary
		"	D. E. Hardman	Ellington
		"	W. W. Watton	Rocky Halton
		"	Turana	Lot L.H.
		"	Mandemba	Lot D.U.
		"	Tebenga	"
		"	E. F. Gariand	Springvale
		"	E. W. Veley	Ay borpe
A. H. Ball	Weenen	"	L. Howes	Mornington
		"	J. P. Lotter	Berg Vlet
		"	P. H. Van Rooyen	Buffels Hoek
		"	W. O. Harding	Melietuin
		"	W. M. J. Lotter	Waterfall
		"	L. C. Kinsman	Mount Mo iah
		"	P. P. van Rooyen	Doornkloof
		"	P. J. van Rooyen	Middleburg
		"	G. J. v.d W. schuizen	Winterhoek
		"	G. J. v.d Wes huizen	"
		"	Naude & Lotter	Scottshoek
		"	J. T. van Rooyen	Beile Vue
F. Kruger (acting) .	City, Umgeni .. .	"	Mrs. Hair & Sons	Oribi Vlake
		"	Unwell	Zwaartkop Location
		"	Dria	"
		"	Samuel	"
		"	Jantje	"
		"	Laduma	"
A. J. Marshall . . .	Dundee.	"	L. Taylor	"
		"	A. C. Vermaak	Sigtuma
		"	T. C. Vermaak	Harrisdale
		"	J. W. de Brayn	Rooifontein
		"	B. J. Badenhorst	Kem enveld
		"	L. Badenhorst	Kelvin
		"	H. A. J. Davel	Kliprug
		"	C. T. Vermaak	Kalderfontein
		"	H. P. Handley	Giba
L. C. C. uickshank ..	Alexsndra	"	D. C. Uys	Parys
B. Klussener	Lower Umzim'ulu	Lungsickness	C. Stuart	Jolivet No. 3
			Nyapu	Berbeck

MANGE IN HORSES EXISTS AS UNDER

Owner.	Farm.	District.
Pinda, Vete & Sobuon ..	Strathsoen	Impendhle
Natives	Olivefontein	Unvoti
Natives	T. tworth	Lion's River

Notice.

OWING to the increasing demands upon our space, we have arranged to publish *quarterly* instead of monthly as hitherto certain standing reference matter. This matter will consist of (1) Scale of Charges for Vaccines, etc., at the Government Laboratory; (2) List of East Coast Fever Advisory Committees; (3) List of Executives of Farmers' Associations; and (4) List of Publications issued by the Department of Agriculture. In future readers will find this matter in the January, April, July and October issues of the *Journal*.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 16TH JUNE.

Mooi River.—Three brown Kafir sheep, tip off right ear, slit in left ear, no brands ; with three lambs, no marks or brands.

Ashley, Ivopo.—Running on the farm "Eskdale," Ivopo Division, on the 1st May, and reported by Mr. A. R. Gold as being too wild to be driven to the Pound. Iron grey filly, about 14 hands, small star, small white patch on top of hip and one under flank, both on near side ; about three years old.

ON THE 7TH JULY.

Solferino, Gourton.—Dark bay mare, star on forehead, near side hind foot white. Iron grey filly, white patches on face, off side hind foot white, branded on near side hind leg, looks like D.

Mount Hope, Besters.—Eighty-four mixed Kafir goats, various marks.

Agricultural and Other Shows, 1909.

DUNDEE (Dundee Agricultural Society).—Show, 10th and 11th June. J. McKenzie, Box 105, Dundee, *Secretary*.

GREYTOWN (Umvoti Agricultural Society).—Date not fixed. W. H. Gibbs, Box 24, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Date not fixed. E. V. Bambrick, Box 90, Ladysmith, *Secretary*.

NEW GERMANY (Durban County Farmers' Association).—No separate show contemplated ; but it is intended to join the Durban and Coast Society for the purpose of making complete exhibit of Durban products.

PIETERMARITZBURG (Royal Agricultural Society).—Show, 17th, 18th and 19th June. Duff, Eadie & Co., *Secretaries*.

PIETERMARITZBURG (Natal Poultry Club).—Show, 17th & 18th June. A. J. Peters, Box 197, *Secretary*.

UMZINTO (Alexandra Agricultural and Horticultural Association).—Show, 8th July. George Lamb, Box 68, Umzinto, *Secretary*.

CAMPERDOWN (Camperdown Agricultural Society).—Show, 23rd July. Messrs. Walker & Burchell, Camperdown, *Secretaries*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—7th, 8th and 9th July. J. Morley, 399, Smith Street, Durban, *Secretary*.

DURBAN (Durban and Coast Poultry Club).—Show, 14th, 15th and 16th July. H. M. Fletcher, 26, Castle Arcade, Durban, *Secretary*.

HARDING (Alfred County Farmers' Association and Agricultural Society).—Show, 23rd June. H. C. Hitchins, "Hluku," Harding, *Secretary*.

NEW HANOVER (New Hanover Agricultural Association).—Show, 30th July. W. D. Stewart, New Hanover, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Byrne Farmers' Association ; Eshowe District Farmers' Association ; Richmond Road Farmers' Association ; Donnybrook Farmers' Association ; Ladysmith Farmers' Association ; Hattings Spruit Farmers' Association ; Boston Farmers' Association ; Little Tugela Farmers' Association ; Umvoti Farmers' Association ; Highflats Farmers' Club ; Vryheid Agricultural Society ; Garden Castle Farmers' Association ; Nottingham Road Farmers' Association ; Seven Oaks Farmers' Association ; Richmond Agricultural Society ; Slangrivier Boere Vereeniging.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

	Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
			Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300 lbs. weight.	Over 300 lbs. weight.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1. Receiving per head	0 3	0 6	0 6	0 6	0 3	0 3
2. Killing and Cleaning "	2 3	3 6	2 9	3 3	2 6	3 0
3. Labour "	0 3	0 6	0 3	0 6	0 3	0 6
4. Disinfectants "	0 1	0 1	0 1	0 1	0 1	0 1
5. Bagging (4 Quarters) per body	1 9	3 0	2 6	2 9	2 3	2 6
6. Cleaning of Tripes each	0 6	0 6	0 6	0 6	0 6	0 6
7. Chilling of Beef, up to 72 hours or portion thereof per body	1 0	2 9	2 0	2 6	1 9	2 6
8. Chilling of Offal, up to 72 hours or portion thereof per set	1 0	1 0	1 0	1 0	1 0	1 0
Chilling and Freezing Beef—						
9. 1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10. 2nd " " " " " "	1 0	4 0	3 3	3 6	3 3	3 3
11. 3rd and remaining weeks or portions thereof "	0 8	3 0	3 0	3 0	3 0	3 0
Chilling and Freezing Offal—						
12. 1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13. 2nd " " " " " "	1 0	1 3	1 0	1 0	1 0	1 0
14. 3rd and remaining weeks or portions thereof "	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars, apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

Farm Apprentices' Bureau.

LIST OF APPLICANTS.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

- | | | | |
|-----|-----|---------|---|
| No. | 1. | Age 16. | Has had 12 months' experience on a stock farm and 9 months' experience on an agricultural farm. Speaks Zulu and has a slight knowledge of Dutch. Is particularly anxious to get back on a farm. |
| „ | 2. | Age 15. | Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch. |
| „ | 3. | Age 24. | Colonial born. Has a knowledge of bookkeeping. |
| „ | 4. | Age 18. | Natal born. Anxious to learn. |
| „ | 5. | Age 24. | Speaks Zulu. |
| „ | 6. | Age 17. | Still at school. Speaks French fluently, and has a fair knowledge of German and Dutch. Is very well educated. Particularly anxious to learn farming. |
| „ | 7. | Age 15. | Is keenly interested in farming. |
| „ | 13. | Age 20. | Is an orphan. Is anxious to learn farming. |
| „ | 14. | Age 16. | Natal born. |
| „ | 15. | Age 19. | Is desirous of learning farming. |
| „ | 16. | Age 21. | Has had some experience on a mixed farm at Besters. Speaks Zulu. Is keenly interested in farming. |
| „ | 17. | Age 20. | Speaks Zulu. Is keenly interested in farming. |
| „ | 18. | Age 21. | Speaks Zulu. Is keenly interested in farming. |
| „ | 19. | Age 17. | Speaks Dutch. Is keenly interested in farming. |
| „ | 20. | Age 18. | Is an orphan. Is anxious to learn farming. |
| „ | 21. | Age 21. | Speaks a little Dutch and Zulu. Is a good mechanic. |
| „ | 23. | Age 19. | Speaks Zulu and has a slight knowledge of Dutch. Has had two years' experience as a farrier and a wagon builder. Is keenly interested in farming. |
| „ | 25. | Age 23. | Bricklayer by trade. |
| „ | 26. | Age 18. | Speaks Zulu. Was brought up in a farming district in Scotland. |

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the fund, Colonial Offices, Pietermaritzburg.

All correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 120.—Colonial born, 26 years of age, steady and an abstainer, carpenter by trade, and has had four years' experience of mixed farming in Natal, speaks Zulu and understands Dutch, desires to obtain employment on a farm (Northern District or the O.R. Colony preferred).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep for a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

A healthy sow can be bred within a week after her pigs are weaned.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for Sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

TENDERS FOR MONO-RAIL SYSTEM.

Tenders are invited for the purchase of 6,400 feet of mono-rails, with points, etc., and four sugar cane trucks, from the Central Experiment Farm.

Tenders should be addressed to the Director, Cedara, and should be submitted with the least possible delay.

MAIZE SEED.

Growers who may have for sale selected seed of the following types of maize are invited to communicate as early as possible with the Director, Cedara:—Horse Tooth, Hickory King, Boone County, Golden King and Yellow Dent.

POULTRY.

Orders will be received for selected cockerels of the following breeds for immediate delivery:—Buff Orpingtons, White Minorcas, Silver Wyandottes and Plymouth Rocks,

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

DEVON BULLS.

Offers are invited for three young South Down bulls, by imported bull, "Star of the West." Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible:—

Admittance of Students to the School of Agriculture.—House Master, Cedara.

Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.

Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.

Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.

Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.

Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.

Agricultural Seeds, etc., for Irrigation Farming.—Curator, Government Station, Weenen.

Fruit.—Orchardist, Cedara.

Accounting Business.—Accounting Clerk, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry,
Cedara.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandria County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Kriantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

SOUTH AFRICAN STUD BOOK.

A record of all classes of Stock: the object being to encourage the breeding of thoroughbred stock and to maintain the purity of breeds, thus enhancing their value to the individual owner, and to the country generally.

Application for Membership and Entries of Stock should be addressed:—

For CAPE COLONY ..	..	A. A. PERSSE, P.O. Box 703, Cape Town.
„ TRANSVAAL ..	..	F. T. NICHOLSON, P.O. Box 131, Pretoria.
„ ORANGE RIVER COLONY ..	..	E. J. MACMILLAN, Government Buildings, Bloemfontein.

THE SOUTH AFRICAN STUD BOOK

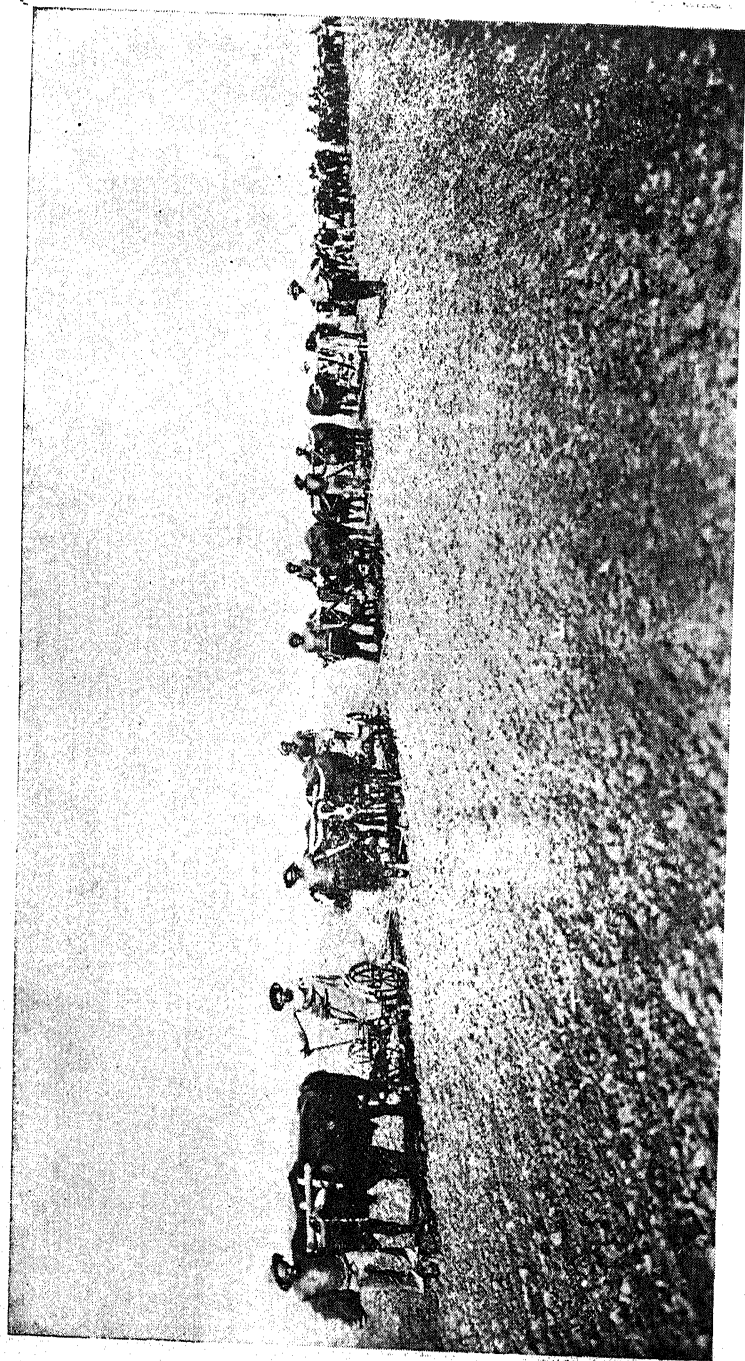
IS OBTAINABLE OF—

T. MASKEW MILLER,

ADDERLEY STREET, CAPETOWN.

PRICE 10s. 6d.

A. A. PERSSE,
SECRETARY, SOUTH AFRICAN STUD BOOK ASSOCIATION,



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MEALIE-PLANTING AT VEREENIGING.

/ Messrs. Malcomess & Co., Durban.

The above illustration shows twelve "Champion" mangle planters, supplied by Messrs. Malcomess & Co., of Durban, in use on the farm of Messrs. Lewis & Marks, Vereeniging. These machines have given such great satisfaction that Mr. W. A. McLaren, who manages the estate, has ordered twelve more for use on this estate alone—a striking testimony to the merits of this particular planter

The Natal Agricultural Journal.

Seeding Grass Lands.

WHILE the great progress made in recent years in the introduction of exotic grasses is a matter of great satisfaction, we cannot but think that our farmers are not making the most of the pastures put down, and very many of these pastures have not been sown in the best possible way. The season just closed has been such a good one that pastures should be at their best. Yet, while just here and there one may find a really good sward, properly cared for, in the great majority of cases very grave faults appear, and many of the faults are well within the control of the farmer. The standard set up by the progressive farmer is to treble the carrying capacity of the veld, and, considering how poor our natural veld is for all but about three months of the year, this ideal standard should be quite possible of attainment. Where *Paspalum dilatatum* has been sown largely, the standard has already been reached as far as quantity of food is concerned, although we think it remains to be seen whether *Paspalum* alone will prove a well-balanced ration for all the year round. This proof must come from the midlands, where this grass will remain perennially green, for in the high veld there is of necessity a change of ration when the *Paspalum* is killed by frost. Perhaps there may be the same doubt in some minds about Italian rye grass, or any other grass which is sown alone.

Of the evident faults we observe on so many farms, two specially call for comment, partly because of their prevalence and partly because we are convinced that a little thought and care would remove them.

The one object in view in sowing grasses is to provide green, suc-

down as a foundation principle. Yet on many farms recently we have seen fine stands of grass of various kinds which were nearly worthless because they were full of old seed stalks and old growth. We want to point out that it is just as important that a pasture should be prepared for winter use as it is to grow the grass in the first place. Cattle will not find the fresh green food which lies somewhere out of sight at the base of an old plant. Sheep will starve on such neglected pasture.

Now, during the first winter after sowing there is no difficulty of this sort. All growth is young and luscious. It is the second year that the trouble arises, and in after years if the grass should be of a kind which stands longer than two years, such as cocksfoot or *Paspalum*, or certain mixtures. In the second and subsequent years every pasture should be mown for hay not later than the end of February, and the aftergrowth only used as the winter pasture. From, say, mid-February until the frost sets in there is plenty of time for a good growth to set well, and this after-growth, or "fog" as it is called in some parts, is ideal grazing for both sheep and cattle. There may be, however, some seasons so wet that it is impossible to cure hay successfully. In that case it would pay well to have the pastures well grazed down until the same dates, and then to take off the stock until there again be a sufficiency for winter use.

We think our readers will easily see the force of our remarks, and that the application of the principles involved will not only result in a better pasture for the winter, but give them in a fair season a good stack of choice hay. There is a doubling, not a reduction, of the quantity available, and the doubled quantity is of much better quality for all uses.

Another very general failing in pastures is in the quantity of weeds and common veld grasses there. And where these are plentiful one also sees many bare patches. The prevalence of the weeds and indigenous grasses, always of most vigorous growth, has a most pernicious effect on the better grasses; and the bare areas, besides offering free play to evaporation by sun heat, are a sheer waste of good, manured land.

There may be two causes for this—the sowing of the grass seed on foul land, or a poor stand of grass from the seed sown. The first cause is surely pure carelessness, for to sow fine grasses on foul land is to court failure. If this class of land is the only kind available it would be far better to wait a season longer, and have it thoroughly cleaned by a crop of Japanese millet or potatoes previous to sowing the grass. The second reason is another bit of evidence of that false economy so fatal to good farming, the economy (?) in this case being in the quantity of seed sown per acre. We will give a few reasons why seed should be used very generously in our climate, and we feel sure that the reasons will carry conviction with them.

The farmer cannot tell, when sowing, whether he will get a spell of wet or dry weather afterwards. If wet he knows that the seed will be

cent. of the seed will germinate and make good plants, and in this case a full and satisfactory stand results. But if, on the other hand, he should get a month's comparatively dry weather perhaps only 50 or 60 per cent. of the seed will grow, some of the seeds near the surface and on the surface not having sufficient moisture to promote germination. This contingency is of far too common occurrence to need emphasising. It is better, then, to sow plenty of seed as an insurance against dry weather. The stand will not be too thick in any case, and it may be regarded as tolerably certain that there is sufficient seed at just that depth where there is still enough moisture to promote germination even if a dry spell does set in to give a fair stand.

The whole trouble in Natal with imported grasses arises from winter evaporation. This is probably the cause of the short life of grasses and clovers which are considered to be of a fairly permanent nature in other countries. We want to point out clearly that every single inch of ground unoccupied by a plant means increased evaporation; and that, not only is the moisture drawn out of that particular inch, but through that inch from the roots of all the plants in the immediate vicinity. How great a proportion of land is thus dried out beyond the actual bare area it would be impossible to say, but certainly it is a large one. The point to be attained in laying down a field to grass is to have every square inch covered with herbage to prevent evaporation during the dry season—to have close, compact sward rather than a multitude of single tufts between which sunlight will reach the roots. This can best be secured by a plentiful seeding.

A fine oat straw, or a fine millet straw, is acknowledged to be far better feeding than one coarse and thick. It is exactly the same with grasses in the green state. A multitude of tender and succulent blades is far better feeding, far more luscious, far more nutritious, than a few tufts of coarse, strong blades. To secure a fine compact growth what better method could one adopt than a generous seeding? Even cocksfoot, so commonly condemned on account of its coarseness, will form a good and compact turf if sown thickly. Our most experienced lucerne-growers' are just finding out the truth of this principle, and instead of sowing 15 lbs. of seed to the acre are now sowing 25 lbs. They say the consumer wants a fine, well cured straw, and with a heavier seeding they can secure not only this, but are also able to save all leafage which was previously lost in the curing of the heavier straw from thin seedlings. The consumers of other kinds of pasture need just the same thing, in a sense: a finely grown and succulent grass; but this is impossible in a thin pasture.

The more full your field is of the grass you want to grow the less chance there is of the entry of pernicious weeds and grasses you do not

crop of Japanese millet is sown. There is no particular virtue in the millet, as millet, to this end: it is the thick and vigorous growth of the crop which keeps the weeds down; and so it is with a full crop of grass.

While we wish to emphasise that more seed should be sown, for the reasons given above, let no one think that we deprecate economy in seeding. It is easy to go to the other extreme and be wasteful. The whole of our contention may be summed up thus: It is better to sow too much than too little, in order to ensure a good stand—a stand which will form a good compact turf—despite the prevalence of conditions which are antagonistic to the free growth of the seed and seedlings. We are quite sure that a little more attention to the points mentioned will serve considerably to enhance the value both of our temporary and of our permanent pastures.

If the cow is constipated, it is usually better to treat her by a change of diet rather than with remedies. Flax seed meal or a liberal amount of oil meal will many times correct the trouble. If either of these fail, then give a half-pint of Epsom salts in the soft feed, or a pint of raw linseed oil as a drench.

The following appointments in the Veterinary Department have been made by His Excellency the Governor in Council:—James Ralfe, to be a stock inspector, with effect from 1st April, 1909; E. J. B. Hosking, to be stock inspector for that part of the Camperdown Division lying to the west of the Umlazi River, in addition to his present appointment; F. Kruger, to act as stock inspector for that portion of the Camperdown Division lying to the east of the Umlazi River, in addition to his present acting appointment; A. Smith, to act as assistant stock inspector for that portion of the Camperdown Division lying to the east of the Umlazi River, in addition to his present acting appointment; A. W. Smallie, to act temporarily, and during pleasure, as stock inspector for the Dundee Division, with effect from the 2nd June, 1909; and A. E. Praetorius, to act as assistant stock inspector for the Richmond Division, and for that portion of the Camperdown Division lying west of the Umlazi River, with effect from the date of

The Maize Crop in May.

We have this month to report a slight change on the wrong side in the maize crop of the Colony since our last issue—a matter of about 20,000 muids. At the end of April, as we stated in our last issue, the average condition of the crop was 2·7; from the reports we have received on the crop at the end of May we find that the average condition was 2·64. This corresponds to a probable yield of a little over $4\frac{1}{2}$ muids to the acre, making a probable total crop of 750,000 muids.

For the purposes of comparison we again set forth the average condition of the crop, the yield per acre that condition represents, and the total crop promised thereby, at the end of each of the months, December, January, February, March and April, adding thereto the figures for May:—

At End of—			Condition.	Yield per acre.	Probable total crop.
				Muids.	Muids.
December	...	2·7	4·7	780,000	
January	...	3·1	5·34	886,000	
February	...	3·0	5·16	856,000	
March	...	2·69	4·63	770,000	
April ...	...	2·7	4·65	770,000	
May ...	...	2·64	4·54	750,000	

Using the figures 1, 2, 3 and 4 to represent the conditions "Poor," "Fair," "Average" and "Above the Average," we have prepared the following comparative statement, which will doubtless prove of interest to the reader, as showing the progress or otherwise the crop is making in each of the Magisterial Divisions of the Colony. The condition represented by the figures 2·7 will serve as an example in order to illustrate our method. The figure "2," it will be remembered, represents the condition described as "Fair," whilst "3" represents "Average" condition. Thus 2·7 will represent an *average* condition of from "Fair" to "Average," but a little nearer "Average" than "Fair." This does not mean, of course, that all the crops in that Division may be described as 2·7 in condition. In fact, it may easily be that not a single field is of such condition. The meaning is that, taking the crops as a *whole*, their condition is something a little more than midway between "fair" and "average."

CONDITION OF CROP.

(Note.—A condition "above the average" is represented by the figure 4; "average" by the figure 3; "fair" by the figure 2; and "poor" by the figure 1; intermediate figures represent corresponding conditions.)

Division.	Condition of Crop at End of—					
	Dec.	Jan.	Feb.	Mar.	April.	May.
Lower Umzimkulu ...	2·7	3·0	2·7	2·5	2·5	2·0
Alexandra ...	2·5	4·0	4·0	3·0	3·0	2·0
Umlazi ...	3·0	3·0	3·0	2·5	2·0	2·5
Inanda and Indwedwe ..	3·0	4·0	3·0	2·0	3·0	3·0
Lower Tugela and Mapumulo	2·0	4·0	3·0	2·0	3·0	2·0
Impendhle ...	3·0	3·0	3·0	3·0	3·0	2·0
Alfred ...	3·0	4·0	3·4	4·0	3·0	4·0
Ixopo ...	2·4	4·25	3·5	3·0	2·75	3·0
Richmond ...	2·5	3·0	3·0	2·5	2·0	3·0
Umgeni ...	3·0	3·5	4·0	3·2	3·4	3·5
New Hanover ...	2·0	2·75	2·4	3·0	3·0	3·4
Lion's River ...	3·0	3·0	2·5	3·0	3·0	2·5
Umvoti ...	3·7	3·2	3·2	3·5	3·4	3·0
Krantzkop ...	3·0	2·0	4·0	3·0	3·0	3·0
Underberg ...	4·0	3·0	2·4	2·5	3·0	3·0
Polela ...	3·0	4·0	4·0	4·0	4·0	4·0
Bergville ...	3·0	2·7	2·0	2·4	2·4	2·4
Estcourt ...	2·7	2·9	2·5	2·0	2·7	2·4
Weenen ...	3·0	2·0	2·0	2·0	2·0	2·0
Klip River ...	2·8	2·6	2·75	2·4	2·0	1·7
Umsinga ...	2·0	2·5	3·0	2·5	2·0	3·0
Dundee ...	2·0	1·7	2·0	2·0	2·0	2·0
Newcastle ...	3·0	2·9	2·8	2·3	2·3	1·5
Vryheid and Ngotshe ...	2·5	2·0	3·0	1·0	1·0	1·0
Utrecht ...	—	4·0	3·0	2·0	3·0	2·0
Babanango ...	—	—	—	2·0	1·0	2·0
Eshowe and Mtunzini ...	3·0	2·5	3·0	4·0	2·0	2·5
Emtonjaneni ...	2·0	3·4	3·4	3·0	3·0	2·0

The figures in this statement show how the crop has been faring, month by month, in the different Magisterial Divisions. It may be of interest also to compare the average condition in each of the geographical belts at the end of February, March, April and May, which is done in the following statement:—

	Condition of Crop at end of—			
	February.	March.	April.	May.
In the Coast Belt ...	3·5	2·6	2·9	2·3
In the Midland Belt ...	3·3	3·1	3·0	3·2
In the Upland Belt ...	2·6	2·2	2·3	2·0

Last month we calculated the surplus available for export this season, oversea and overland, as about 370,000. That calculation was made on the basis of a probable crop of 770,000 muids. With the crop reduced to 750,000 muids, the exportable surplus will probably be somewhere in the vicinity of 350,000 muids.



Half-Yearly Volumes.

OUR readers will, we think, be pleased to hear that we have decided to issue the *Journal* in future in half-yearly volumes instead of annual volumes as hitherto. The annual volumes, it must be admitted, are too bulky for easy handling, and do not last nearly as long if they are used frequently as volumes half their size would. The present issue accordingly brings to an end Volume XII., and with our next number we will issue an index and title page in order to permit of the binding of the first six volumes of the year. The subscription, of course, remains as hitherto, namely, five shillings per annum post free in British South Africa.

Joanovitch Cotton.

The Commercial Agent for Natal in London (Mr. Francis Harrison) has obtained and transmitted to the Department of Agriculture a copy of a report, by an expert in the cotton trade, on a sample of cotton grown near East London. As this report will doubtless interest many of our readers, we reproduce it herewith in full. The report says: "I have carefully examined the sample of cotton submitted by you, and, after having the same ginned, think its commercial value would be about 8d. per lb. in this country. The cotton is grown from Joanovitch seed and has retained all its characteristics; although the staple is not quite up to its full length the cotton is quite satisfactory and saleable.

"The ginning out-turn showed about one-third lint and two-thirds seed, which is about the usual outturn. I think a much more satisfactory outturn would be obtained by growing ordinary stapled cottons; the outlet for this style of cotton is very great, as it is required for ordinary goods, but the finer growths are required for special goods which are sold at higher prices, consequently it is more difficult to induce users of the finer cotton to experiment with a new growth, as the loss would be very large if the experiment was unsuccessful."

Analysis of Weenen Phosphates.

The following report has been made by Mr. John G. Rose, of the Government Analytical Laboratory, Capetown, on the results of analysis of samples of Natal phosphates submitted through the Hon. Prime Minister of the Cape Colony by Mr. P. D. Simmons, of Mooi River:—"Report on the analysis of a sample of Natal phosphates submitted by the Honourable the Prime Minister by letter dated the 7th instant, and referred for analysis, by endorsement thereon of even date, by the Under Secretary for Agriculture. The following are the analytical results:—Lime, 34.22 per cent.; total phosphoric oxide, 25.73 per cent.; citrate soluble phosphoric oxide, 1.15 per cent.; water soluble phosphoric oxide, nil. The sample is an excellent phosphatic manure and is worth about £7 10s. per ton."

Food Congress, 1909.

The highly successful Congress in connection with the suppression of frauds in food, which was inaugurated last year at Geneva, will, we understand, be succeeded by a similar Congress to be held in Paris during October of the present year. The Congress is under the auspices of the Society of the White Cross of Geneva, presided over by Mr. C. H. Vuille of that city, and it is contemplated that the forthcoming Congress will far exceed, in numbers present, those who attended at Geneva. At the forthcoming Congress at Paris, the principal object will be to define such methods as will prevent the fraudulent adulteration of food, but there will also be section devoted to chemical products, pharmaceutical preparations, mineral waters and similar substances. The list of foods alone, which will be discussed, is an imposing one, and includes all the various well-known products used in our domestic economy. There will be two principal sections in connection with the Congress, namely, the technical section and the industrial one, and it will be for the adherents to those two sections to define clearly what purity of the various substances discussed really means. It is obvious, also, that the combination of technical and scientific men along with actual producers is likely to lead to clear and practical definitions.

The Congress will be of a highly important character to every one connected with the food supply; and it is anticipated that there will be a considerable representation of British interests in connection with the technology and science of the subject as well as in connection with agriculture and manufactures of food products. Those who intend to participate in the Congress, either by the appointing of delegates or as individuals, should communicate with Mr. Loudon M. Douglas, College of Agriculture, Edinburgh. The General Secretary is Mr. Robert Fazy, 42, Rue du Rhone, Geneva.

Maize Competition.

Some interesting competitions are being arranged for the Annual 1910 Show of the Bloemfontein and O.R.C. Agricultural Society, and one of these in particular will, we think, appeal to Natal farmers. This particular competition is for a prize of £20, which is to be given by De Beers Consolidated Mines, Ltd., for the best exhibit of maize, to consist of three muid bags of grain and one bag of ears of one variety, South African grown, on "Dry Lands." The bag of ears is to be representative of the crop from which the grain was threshed. A certificate must accompany each entry, signed in the presence of a Field Cornet or J.P., stating that the exhibition has produced at least 200 bags of maize on dry lands during the season; and that this particular exhibit was grown without irrigation. The entrance fee will be £1. There will probably be a number of our farmers who will be desirous of competing; and we would advise those interested to write to the Secretary of the Society, Mr. C. McG. Johnston, whose address is 14, Board of Executors' Building, Bloemfontein.

Importation of Meat into the Transvaal.

The following regulations for the importation of meat from Natal into the Transvaal have been promulgated in the *Transvaal Government Gazettes*—(1) No person shall import from the Colony of Natal the hide, the head, the tail, the leg below the knee, or the hock of any cattle, neither shall be introduced any offal thereof unless such offal has been thoroughly cleaned and hung up in such a manner that it can be readily examined; (2) No person shall import from the Colony of Natal any portion of any cattle unless the said portion is freed from all portions of hide and is properly covered and hung up in clean covered trucks in such a manner that it can be thoroughly and expeditiously inspected; (3) Any person contravening these regulations shall be liable on conviction to a fine not exceeding fifty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding six months.

These regulations do not apply to meat imported from overseas into Natal from countries in which East Coast Fever does not exist, nor to meat which has been inspected by an officer of the Veterinary Division of the Transvaal Department of Agriculture, previous to being trucked; provided that such meat comes forward in trucks distinctly marked "Foreign Meat" or "Meat inspected by the Transvaal Department of Agriculture," and accompanied by a declaration as to the character of the consignment contained in each truck.

Training in Fruit Culture.

Intimation has been received through the Natal Commercial Agent in London that "one of the most enterprising growers of fruit in the south of England," who is "thoroughly up-to-date in everything relating to the culture and marketing of fruit," desires to take one or two pupils to instruct them in the proper cultivation, packing and grading of fruit. The gentleman in question lives in Kent, and he is described as being thoroughly in touch with all the big markets, and "his conscientious methods have earned for his produce an enviable position in the trade. Besides this, he is a gentleman of education, and thoroughly capable of imparting his wide knowledge of his profession to anyone desirous of a sound training in fruit farming." We shall be glad to place any interested reader of the *Journal* in communication with the gentleman referred to. Address enquiries to the Editor of this *Journal*.

Another New Fibre Machine.

More and more frequently now do we hear announcements of new and improved fibre machinery being placed on the market, and the number of machines now which the fibre grower has to choose from is quite a large one. In our last issue we referred to Maingard's Automatic Defibrating Machine; the latest addition to the list is the "World's Decorticator," for decorticating and scutching—a machine which, it is claimed, successfully treats aloe, sansevieria, pineapple, banana, *Phormium tenax*, and other fibres, whilst, it is said, satisfactory trials have been made with the ramie and jute plants.

In the words of the prospectus which we have before us, the "World's" machine has been invented to overcome the points of failure in existing systems. In its construction it is a combined crushing and combing machine, and is so simple in its action that anyone can attend to, and work it without previous knowledge of the business of decorticating. By this system the leaves and stems have their fibres extracted in one operation, and the combs are automatically and continuously cleaned during the time the machine is working. Up to the present time a beating action has been employed in nearly all the machines used for separating the fibrous parts of leaves and stems from the pulpy and woody matter in which they are embedded. In carrying out this beating action, blades are employed which have to be set very accurately to work against a plate or cushion, and owing to this great accuracy it is necessary to have a skilled workman to set and attend to the working of the machine in order to avoid waste, as should the blades be set too closely the fibre is chipped and destroyed, while if the blades are not set sufficiently fine the work of cleaning the fibre is not properly done; furthermore, it is necessary to

have considerable power to drive the machines now on the market, some requiring as much as 60 horse-power. With the hand-power "World's" machine, we learn, "two ordinary native labourers can produce upwards of 80 to 100 lbs. of clean fibre per day, whereas by the usual hand beating a native can do only about 3 lbs. per day." The machine is being put on the market by the World's Fibres Machinery Corporation, Ltd., 15, Finsbury Circus, London, E.C.

Mason's Annual.

We have received from Messrs. R. Mason & Son, the well-known firm of seedsmen, millers and grain merchants, of Maritzburg, a copy of their newly-issued "Garden and Farm Annual" of seeds for 1909-10. The Annual is divided into six parts: "The Newest" for vegetable garden, flower garden, and farm; garden calendars in vegetables and flowers; catalogue of vegetable seeds; catalogue of flower seeds; catalogue of farm seeds, and miscellaneous (*e.g.*, lists of climbing plants, *Eucalypti*, fruit trees, fertilisers, garden sundries, etc.) The catalogues are very comprehensive in all the classes, and some comparatively little-known plants, but plants that deserve to be known more widely, are mentioned. The farmer, as well as the market gardener and flower gardener, will find this catalogue of much value; and we have no doubt that Messrs. Mason and Son will be pleased to send copies to farmers and others making application.

A Department of Tropical Agriculture.

A movement is on foot having for its object the establishment of an Imperial Department of Tropical Agriculture; and at the last annual meeting of the Associated Chambers of Commerce of the United Kingdom, held early in March, a resolution was proposed by Mr. J. C. Atkins, of Oldham, and carried unanimously, strongly urging upon the Government the importance of establishing such an Imperial Department of Tropical Agriculture.

In moving his resolution, Mr. Oldham said that a large part of the British Empire lay within the tropics and contained extensive tracts of the most fertile land in the world, which was largely undeveloped. These lands were capable of producing immense quantities of foodstuffs and raw materials, which would bring prosperity to the inhabitants, and thus by increasing their purchasing power, also benefit the Mother Country. The natives could be helped to grow more of the products they now cultivated, and also new ones suitable to the various climates could be introduced. But, in order that this might be done properly, and to avoid useless expenditure, a thorough knowledge of the

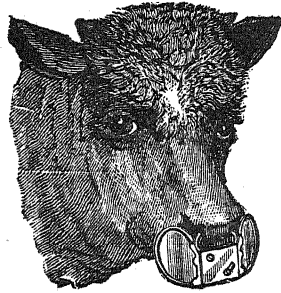
climatic conditions, the rainfall, the quality of the soil, labour supply, and transport facilities, etc., were necessary. That could only be done satisfactorily by a Government Department. In India and Ceylon, and in parts of South Africa, much good was being done by the Agricultural Departments, but there was no relationship between those different bodies, and there must be some central authority if the best results were to be obtained, so that the information and experience gathered might be available for the whole Empire. To ensure unity of purpose in the carrying on of such a department, it must be on an Imperial basis. From his connection with the British Cotton-growing Association, he knew the great difficulties which had to be contended with in the initial stages from want of information as to the climate, soil, and also of technical knowledge, and many mistakes were made and money lost. The same remark applies to many other products. The history of the British Cotton-growing Association and its results, proved what could be done in developing the Colonies, if proper methods were employed. It was only about seven years since the idea of growing cotton within the Empire was started. Now it had been proved that cotton of every variety can be grown under the British flag, and the industry had been firmly established.

What had been done in cotton, Mr. Oldham continued, could surely be done in other commodities. Rubber, for instance, was being grown in many parts of the Empire, but much of it was of inferior quality owing to lack of knowledge. The natural resources of our Empire were enormous, and, if only properly developed, would bring prosperity to all. In order that this might be brought about it would be necessary to have agricultural departments in all the Colonies, and a central department in London, where all the information and experience that have been collected will be gathered together, and experts will be able to advise, assist, and direct on all matters in connection with tropical agriculture. The work should be concentrated in one department whose sole object would be to develop the agricultural resources of our tropical possessions, acting in conjunction with departments in the Colonies, formed on lines similar to that in the West Indies. The cost of the central department would be borne by the Imperial Government, and that of the branches principally by the Colonies themselves.

A Useful Sucking Cow Muzzle.

With reference to Mr. J. L. Allkins' letter and our reply thereto in the last issue of the *Journal*, regarding a cow sucking her own milk, we have received from Messrs. Malcomess & Co., Ltd., of Durban, a leaflet descriptive of Rice's Calf Weaner and Sucking Cow Muzzle, together with an illustration of this useful little device. This "weaner" pre-

vents calves and cows from sucking themselves or each other—habits which are most injurious to the animal and costly to the owner. The use of the “weaner” offers no hindrance to either eating or drinking, it does the animal no injury, and we learn from the leaflet, has been thoroughly tested, is used and endorsed by stock raisers in the United States and England, and is approved by the Royal Society for the Prevention of Cruelty to Animals. The illustration which we reproduce herewith shows how the weaner is used.



Prices of Fibre.

At the request of the Department of Agriculture the Commercial Agent for Natal in London has obtained some useful information regarding the prices of fibres, and in particular the prices of the *Furcraea gigantea* fibre. It appears that the prices of the *Furcraea* fibre fluctuates like that of sisal, in accordance with the Manila hemp market. The values of these three fibres were very high at the end of 1905 and the beginning of 1906, when “good fair” Mauritius hemp was quoted at about £30 per ton. The prices fell rapidly during 1907, until in March, 1908, it was quoted at only £19 10s. per ton. During the first twelve months the price of this *Furcraea* fibre has been fairly constant, “good fair” quality fluctuating between £19 and £21 10s. per ton. At the present time this quality has a value of about £20 per ton. It is not possible to foretell the future course of the market, as it depends on the various factors which usually affect the commercial value or raw materials.

A Crystallised-Fruit Industry.

The *British and South African Export Gazette* of the 7th May makes an interesting suggestion which merits the careful consideration of South African manufacturers producing canned fruit, jams, and other preserves. “So far,” the *Gazette* remarks, “the manufacture of glaze fruits has never been attempted on any large scale, those now on the South African market being almost entirely imported from France and Germany. We are strongly of opinion that South Africa,

growing so many varieties of suitable fruits, might compete advantageously with these imported goods in the local market, and probably manufacture certain special lines in sufficient quantities to offer successful competition with Continental brands in oversea markets." Nothing, so far as we are aware, has been done in this direction, but there seems little reason why an attempt should not be made to subject fruit to this glacage treatment for the local market and, perhaps, later on, for export. The *Gazette's* remarks which we reproduce herewith will serve to indicate what the establishment of such an industry would mean. It will be seen that the capital required is small, the process is simple, and the only materials which it would be necessary to import would be glucose and sulphur.

"It may be admitted at once," says the *Gazette*, "that the process of fruit glacage is somewhat tedious, but its compensating advantage is the fact that it requires little capital to invest in the necessary plant for the equipment of a factory. The principal utensils are steam kettles and iron grills. The fruit, which must be selected when it is just ripe, is first treated with sulphur, which serves the triple purpose of improving its appearance, destroying microbes, and preparing it for the sugar syrup. The next operation is boiling, after which the fruit is placed in earthenware jars containing sugar syrup. This process of boiling and syruing is repeated six or eight times over a period of at least six weeks, during which the fruit absorbs the largest possible quantity of syrup. Finally, the fruit is drained of its syrup, and then placed in a solution of pure concentrated sugar, which is by a simple operation turned white. This coat dries rapidly when placed on grills and exposed to the air, and the fruit is then ready for boxing.

"Among the principal fruits usually subjected to glacage on the Continent are apricots, gages, figs, and pears, all of which are grown to perfection in South Africa, which, in addition, produces several varieties peculiar to that part of the world, and of a sort that might prove suitable for glaze treatment. Many of these would doubtless suit European palates as well as being a novelty, and this method of treating the delicious naartje should alone spell big business for those who attempt it. With regard to the syrup, sugar of good quality is necessary, and that produced in Natal would answer every purpose. A certain proportion of glucose is also used, for sugar alone would cause the fruit to candy, and, therefore, render it unsaleable. Glucose and sulphur would be practically the only raw materials which it would be found necessary to import. Here, then, is a suggested industry which offers reasonable prospects of profit for the outlay of the small capital required, and one for which the materials are, with one or two unim-

portant exceptions, ready to hand. With ordinary care in the process of preparation, and careful and tasteful packing after the French method, there could hardly fail to be a local market for the products, and there seems to be no reason why many choice varieties of South African fruit subjected to glacage treatment should not also find popularity awaiting them in other parts of the Empire. Most of the crystallised fruit at present sold in Great Britain comes from the Continent, and although it is not cheap there is always a big demand for it, so that South African manufacturers can always rely on a market being found for it, other things being equal."

East Coast Fever Regulations.

The number of new notices regarding East Coast Fever which have been issued since we went to press last month has been small. Two of these are of a general nature, and we will draw attention to these first. On the 21st May a notice was issued remarking that it had come to the knowledge of the Government that one of the Advisory Committees appointed under the East Coast Fever Acts had, for some time past, been in the habit of charging owners of cattle the sum of sixpence per head in respect of movements of cattle, and that a charge of one shilling was being made by the Committee in question for each permit issued purporting to authorise removal of cattle taken over and removed by Government for slaughter under Act No. 8 of 1907; and notifying that no authority exists for making such charges, and that no permit is necessary in respect of cattle taken over by Government for slaughter, when their removal is effected by order or under authority of the Government. —

The second Notice referred to notifies that stock inspectors and other officers of the Veterinary Department who are required to supervise the removal of cattle for slaughter have been instructed to refuse to take over for removal any cattle which are not reasonably free from ticks, notwithstanding that a permit for the removal of such cattle may have been granted by a duly authorised officer. Persons desiring to dispose of cattle for slaughter, and buyers of slaughter cattle, will, therefore, avoid inconvenience to themselves, and possible loss, if steps are taken to thoroughly clean the cattle to be removed before the arrival of the stock inspector or other officer at the farm from which the cattle are to be taken. —

Under Government Notice No. 266, the Minister of Agriculture has declared that the farms "F.P. 218," "F.P. 219," and "Lot No. 1, Dronkvlei," all in the Polela Division, the property of Native Paul Nxasana, shall, for the purpose of the East Coast Fever Act, be deemed to be wholly on the north of the Natal-Cape line of railway; and under

Government Notice No. 314 the zone marked off with flags in Alexandra County along the Alexandra-Ixopo boundary, between the Umkomaas and Umzumbi Rivers, has been declared to be a zone within the meaning of the East Coast Fever Act No. 32, 1903 (Section 4), and the movement of cattle into and within that zone has been prohibited.

The Position of East Coast Fever.

LIST OF OUTBREAKS DURING MAY AND JUNE.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st May to 21st June:—

Dundee District.—Outbreak on farm “Dumain,” east of main line.

Umvoti County.—Outbreaks on farms “Pampeen Nek,” “Mt. Helon,” sub-division of “Wonderboom,” “Blackheath,” sub-division of “Greenwich” and “Alida,” and A. Hohn’s portion of “Middledrift.”

Utrecht District.—Outbreak on farm “Eersterling.”

Krantzkop District.—Outbreaks on farms “Hopetown,” “Kranskloof,” “Speekfontein,” “Pctspruit,” and “Solitude.”

Umgeni District.—Outbreaks on farms “Malden,” sub-division of “Stand-vastigheid,” Lot “A” of Lot 36, “Faulklands,” “Otto’s Bluff,” and among A. Anderson’s cattle, New England.

City Division.—Outbreaks among cattle of Mr. Peattie on “Raisethorpe,” and E. A. Goodwill’s cattle, 443, Bulwer Street.

Lion’s River District.—Outbreak among Natives’ cattle on “Tetworth.”

New Hanover District.—Outbreaks on farms “Glenside,” “Eland’s Spruit,” “Camel Hoek,” “Waterfall,” and Lot 36, York.

Camperdown District.—Outbreaks on farms “Roseleigh,” sub-division of “Klip Spruit,” “Maxwell,” “Larkshill,” and “Assegai Kraal.”

Ixopo District.—Outbreaks on farms “Redington,” “Diamond,” “Greta,” “G.A.,” and “M.C.”

Estcourt District.—Outbreak on farm “Empangeni.”

Bergville District.—Outbreaks on farms “Zuur Laager” and “Boschman’s Klip.”

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of Victoria County, Umsinga, Vryheid, Ngotshe, Babanango, and Paulpietersburg.

Irrigation : Past, Present and Future.

By F. E. KANTHACK, A.M.I.C.E., *Director of Irrigation, C.C.*

(A Paper read before the Delegates to the Robertson Irrigation Congress, May, 1909.)

WHEN I was asked to read a paper before the first South African Irrigation Congress, I felt that the subject matter of such a paper was in my case obvious. My particular sphere of life is to develop irrigation. I came to this country from India 2½ years ago with a perfectly open mind. Though trained to Indian conditions, I have always realised that, though the principles of the science of irrigation—be they hydraulic or agricultural—are identical throughout the world, the application of these principles is dominated by a set of highly complex local conditions. I attempted to take up the thread where my predecessor, Mr. Gordon, left it, and for 2½ years I have been trying to take in the situation; and, though I consider myself competent to express opinions now, I feel that I shall be continually learning something new about my profession as long as I continue to work at it. The function of a Congress, such as this, is to promote irrigation development in its practical and scientific aspects, and I feel, therefore, that I cannot do better than give you my views on the peculiar difficulties with which irrigation development has to contend in this country, the possible scope for such development, and the main lines on which it should advance.

THE FIRST ACT.

In 1877, the first Act of Parliament was passed that made provision for promoting the irrigation of lands in this Colony, and for the preservation and improvement of the supply and storage of water for irrigation purposes; and provided for the advance of public money for the execution of such works. This Act also laid the foundations for co-operative irrigation enterprise by creating the machinery necessary for the formation of irrigation districts and boards, endowing these bodies with power to raise loans by public tender, to be secured by debentures issued by the Board or by petitioning Government for loans out of funds provided by Parliament, such loans being a first charge upon the rate levied by the Board upon land, or other security. This Act was amended several times, chiefly with regard to rates of interest charged and security required, and was finally superseded by the present Irrigation Act of 1906, which brought all the legislation affecting irrigation matters into one consolidated legal instrument. While such legislation has under-

gone steady improvement, it appears to have had but little effect in stimulating development, which is due more to faulty administration of the various Acts than to the Acts themselves.

VIEWED WITH INDIFFERENCE.

Though many people have seen clearly enough the desirability of extending irrigation, and the Government in a fitful way has been engaged on reconnaissance work, on which reports have been published since 1860, if not earlier, yet this means of agricultural development was discredited or viewed with indifference by the majority of farmers residing in the Colony. Up to the close of the nineteenth century, agriculture, except on the most primitive lines, and on the most insignificant areas, had scarcely been attempted, save in the extreme south-western corner of the Cape Colony. This vast country has, from the beginning, been a pastoral country, is so still, and in the main must remain so. Two fundamental causes have checked development of the land in the past—the vast areas at the disposal of a comparatively few people, and the discovery of mineral wealth. Not only the want of development of the land, but its alarming deterioration, and the deterioration also of a vast number of our fellow-colonists, who are annually swelling the ranks of the poor white class, is due to the demoralising effect of too easy a life on farms bounded by high points on the sky-line, aggravated by the curse of black labour. The voortrekkers worked hard, but their descendants were content to live at the expense of Nature. At first, when the families on each farm were few, the natural yield of the veld was sufficient; but with the fixing of the population and its rapid increase the natural capital has been more and more drawn upon, till many farms are now reduced to a state of poverty that makes it hard to picture their comparative prosperity two generations ago. The conditions of early settlement have thus tended to narrow the mind of the pastoral farmer. Completely cut off from all influences of civilisation, the ever-increasing struggle to make a living out of the rapidly deteriorating veld, and complete absence of facilities for education, have produced a class of people whose fatalistic ideas, prejudices, abhorrence of hard labour and of progress, are unintelligible to people who have not studied their conditions of life during the past few generations. Under these conditions mere “enabling” legislation and the investigation of schemes, generally insufficiently considered from an agricultural, social, and economic point of view, have not been likely to bring about rapid development. A spirit of slothfulness was over the people, and the object in life was more to exist than to live. Such existence, that is to say the satisfying of the purely animal cravings and necessities of life, is easier to maintain in South Africa than in almost any other country, and consequently the incentive to

labour is at a minimum. When survey parties are engaged in studying the irrigation possibilities of backward districts, the work is viewed by many with undisguised hostility, by others with indifference or with ridicule. Any excuse is good enough to bring up against a scheme. We have been told that God made the rivers so that the water should run in them, and hence it should not be taken out by artificial means, and also many other quaint objections of a similar nature. Such people who hold that artificial irrigation by leading out water from a river is sinful would do well to read Chapter II., verse 10, of the Book of Genesis, which clearly shows that the Garden of Eden was irrigated from a river by design of the Almighty.

EVILS TO BE MASTERED.

The very worst evils which the apostle of progressive farming has to fight against are the abhorrence of hard work, and the utter want of ambition bred from the most primitive standard of living. "I cannot eat more than three times daily, and why, therefore, produce more than I require for my daily wants" is an argument brought up constantly. No follower of the Prophet is a greater fatalist than are a great number of backveld farmers in this country. The veld is good, and flocks and herds and perhaps ostriches increase and multiply greatly. The lean years follow the fat ones, and great numbers are starved to death. The only attempt to save stock is to trek aimlessly about the country for patches of veld, said to have received a shower of rain. The country is ruined by constant tramping, and the stock are walked to death. Still when the drought is over he has yet a goodly number of animals left, which, given fair years, will increase and multiply. Why work? Why irrigate? God sends the rain and makes the veld sweet. He also sends locusts, diseases, and drought to humble us. Taken as a whole, I have never met with, nor heard of, any white race who have less ambition to improve their material conditions for the benefit of themselves or future generations than the average backveld pastoral farmer of South Africa. As I have said earlier in this address, those characteristics are due to peculiar circumstances, and to judge this type of man hardly on account of those unfortunate peculiarities is very unjust, and shows a complete ignorance of local conditions in the past. It does not follow, however, that these peculiarities are not great evils which must be overcome, cost what it may, and this goal can only be reached through the medium of a practical and thorough system of education. Education is beginning to work wonders in this respect, but it takes more than one generation to revolutionise a complete set of social conditions.

THE SPIRIT OF SPECULATION.

The second fundamental cause is of more recent origin, but has had an exceedingly damaging effect upon the people and on the development

of agriculture, *viz.*, the spirit of speculation engendered by mining and other booms and other evils. The demoralising effect of those booms has left a deep impression on South African character. Even now, half this country is overrun with option-hunters, and hundreds, and perhaps thousands, of landowners are living in a fool's paradise, waiting for a fortune to fall into their laps. For, though many will not do a day's work to make money, they are quite willing to accept a large unearned increment. A volume might be written on the demoralising effects also of transport riding to the great mining centres, which in the past claimed thousands of recruits. The speculation fever has spread to land transactions, and the average owner looks upon an irrigation possibility in much the same light as he would on indications of minerals on his property, *i.e.*, something to gamble with, whereas he should exploit such possibilities himself. Now, I am afraid I have devoted a great deal of time to social matters, but when dealing with the great agricultural development of this country, the social and mental peculiarities of the people must be carefully studied and taken into account, unless we intend to make a hopeless mess of things. The would-be reformer here is for ever pointing to the great things being done in America. I will deal presently with some very practical differences in favour of that country. But, apart from them, the average farmer in the Western States has all the characteristics which make for rapid progress, and which are utterly lacking in the majority of Afrikanders. Our whole line of development must be made to fit in with South African peculiarities—be they personal, as described above, physical, climatic, or economic. We must evolve our own line of development, and not point too much to countries totally different in all the respects first mentioned.

THE PRESENT STAGE.

The new era in agricultural development is based upon intellectual enlightenment, stimulated by certain very profitable farming industries, and fostered by suitable legislation, and this brings us to the present stage of development. The Colony is, however, still in the kindergarten stage, and an immense amount of work remains to be done before the steady deterioration, which has been in progress for some generations, is checked and the true development of the country in general commences. It must be clearly understood, however, that a handful of progressive ostrich farmers making great fortunes for themselves does not constitute development. Not until the rank and file of the farming community have learned to work and how to reclaim their deteriorating farms, how to make the most of all the possibilities of the farms, and to carefully husband all their resources, and finally, the secret of honest and sound co-operation—not till then can we boast about agricultural development. A beginning has now been made, thanks chiefly to the feather industry;

but, though we have every reason to be thankful to this cause, it must not be allowed to act as the sole stimulus to irrigation enterprise. The recent enormous growth of this industry is producing a set of economic conditions which in the near future is likely to have a very bad effect upon normal agricultural development in this Colony, and those conditions will be alluded to later on.

THREE REQUIREMENTS.

Three things are required to endow all the good intentions with life.

Firstly, a vigorous educational campaign to promote the general moral and intellectual advance of the people; to show them the value and necessity of agricultural development, and the methods for effecting this development.

Secondly, systematic reconnaissance of the country with a view to ascertaining its irrigation possibilities, large and small.

Thirdly, the establishment of a profitable industry for which irrigation is necessary, and which would act as a stimulus.

The first of these requirements is being supplied by our present excellent system of universal education, which, despite the great difficulties, is producing great results.

For the second of the two requirements the foundations were laid a few years ago, and the Irrigation Act of 1906, together with the regulation for administering this Act, which were approved by Parliament in 1908, have supplied the working machinery for a vigorous irrigation propaganda. The Act has, unfortunately, not been capable of supplying the funds necessary to carry such a forward policy into effect.

The third requirement, or stimulus, has been provided by the ostrich feather industry, without which irrigation development would, I am afraid, have made very little progress in South Africa. This profitable industry has alone been responsible for the popularising of lucerne cultivation, and to a very great extent is still the determining factor in irrigation enterprise.

PRESENT ENTERPRISE.

At present irrigation enterprise is largely confined to the Breede Valley in the South-West and to the great river valleys in the Midlands—that is, to the great Fish and Sunday's Rivers and their tributaries. In the South-West the country has been settled for so long a period that farms are of moderate size, but in the newer Eastern Province farms are very large. As the amount of irrigation which one individual can develop and work is strictly limited, in most cases the proportion of irrigated land to the area of the farms is much smaller in the Midlands than here in this portion of the Breede Valley. During

the year 1908 loan applications were received for £46,000, which represents about 10,000 acres of irrigation. One hundred and thirty-six applications for advice were received, which represent, at the outside, another 10,000 acres, and over and above this development is proceeding independently of Government money and advice. I should say that during the year irrigation schemes were taken in hand with an ultimate capacity of some 30,000 to 40,000 acres. Considering that these schemes are mostly isolated, and will in many cases form nuclei for further development, and that we have passed through a time of severe drought and very severe financial stress, I think on the whole we must be satisfied with the progress, comparatively small though it be.

ULTIMATE POSSIBILITIES.

We hear it continually said nowadays that the salvation of this country lies in irrigation, and, as an irrigation enthusiast, I heartily concur with this statement. The average South African is, however, hopelessly at sea regarding our ultimate possibilities in this respect. These possibilities are determined by three main factors.

Firstly, the amount of rain falling over such parts of the country which serve as catchments to irrigable tracts requiring irrigation.

Secondly, the "run-off," which can be made immediate use of or conserved for future use, and,

Thirdly, the area fit for irrigation.

It will be seen that the first and second conditions are qualified. As regards the rainfall, there is a great danger of generalising from the mean annual rainfall of the Colony. Taking the period 1885-1894, which is the only one that has been carefully analysed, we find that the mean rainfall for the whole country, excluding the Molopo drainage area, is about 15 inches per annum, and if we assume a 5 per cent. run-off from the 276,000 square miles making up this area, we obtain an available water supply of some eleven million acre feet per annum or sufficient, say, for three million acres of irrigation. Now, I do not think this generalisation worth very much for practical purposes. The mean average includes the comparatively heavy rainfall along the south and south-east coasts and in the Transkeian Territories in the summer, and the copious winter rains of the south-western corner of the Colony. A very large percentage of this rainfall is useless for irrigation. Some parts are humid enough to be independent of irrigation, while the rainfall over the mountainous country near the coast is far in excess of all possible requirements, owing to the very small areas which could possibly be irrigated from those sources. Again, in other places the conservation of all the run-off from certain areas would be out of the question. Hence, in analysing these rainfall statistics, great care must be taken to exclude all such parts of the country which cannot contribute to the requirements of those parts in need of irriga-

tion. For instance, the very heavy rainfall of the Cape Peninsula during the winter months is not, and cannot be, of any possible use to the Robertson district in the summer. Yet, forecasts based on general averages imply this. I regret that I cannot give any reliable figures of what I will call the available rainfall, as, though records are in existence, their careful analysis is a big and laborious task still to be performed. However, considering the area from which the available rainfall must be derived, it will, I think, be found not to exceed ten inches.

THE RUN-OFF.

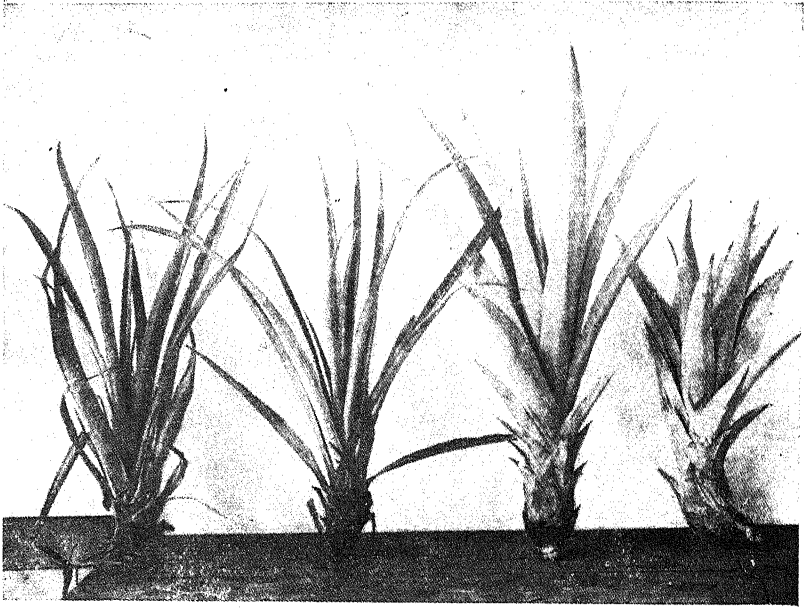
We next come to the run-off, which can be immediately applied to the land or conserved. Here we are on very uncertain ground. The determination of the proportion of run-off for large areas is a difficult matter, and requires a great deal of systematic work for a considerable period of time. If done thoroughly it becomes a very costly procedure. In this Colony I have been working on several well-defined selected areas, but during the present hard times this class of work, which swallows up a great deal of money with very little to show for it, naturally suffers. The run-off varies in inverse ratio to the size of the catchment area considered, and depends upon the character of the country—whether steep or flat, covered with vegetation or bare; long and narrow, or round, and other considerations. This is so far as the mean run-off over long periods is concerned. During individual periods of rainfall the proportion of run-off depends, other things being equal, upon the rate and amount of precipitation. Thus, isolated small showers are useless. They produce no run-off, and by merely wetting the surface of the ground often do more harm than good to vegetation. Half an inch of rain falling quietly on dry ground may produce no run-off. Falling over a catchment already thoroughly wetted by previous rain, it may produce a very heavy run-off. For the purpose of studying this most important question, a very close analysis of all individual falls of rain over a given catchment is necessary, and the form in which our meteorological statistics is presented is of very little value for this purpose. Some engineers assume 5 per cent. as the run-off from the whole country. This is a pure guess, though it is possible it may be near the mark. Granted it is correct of this 5 per cent. of the annual rainfall, the question is, how much can we hope to get for irrigation purposes? With the country in its present dried-up state all but a very small quantity flows away to the ocean or to the great “bloers” or pans of the north-west. We have no rivers in this land now, only torrents. Where it took weeks for drainage to run off in the past it now takes as many hours, and our flood waters are heavily laden with coarse silt, which is very different from the fine-grained alluvium deposited by Karroo rivers in olden times. As regards run-off, our present conditions are very bad, and steadily getting worse;

but by facing boldly the great question of veld and land reclamation, and by restoring to the country its natural clothing of vegetation, which the white man, by his thoughtless and improvident actions, has largely destroyed, leaving the face of the country laked, we will control the run-off in such a manner as to make it all, or nearly all, available for irrigation. Remember always that a stream running for a week with a moderate supply is of far greater value than a torrential flood lasting a few hours, carrying nearly all its water to the sea, and leaving wreckage in its train. Conservation of water in storage dams is comparatively simple under the former conditions. Under the latter conditions it can only be very partially carried out, and is beset with danger and difficulties.

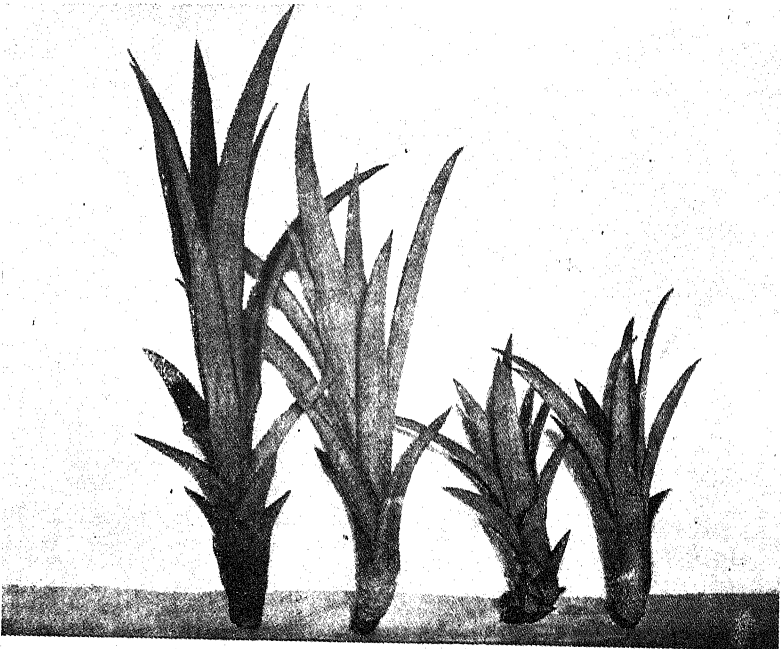
DETERMINING AREAS.

Finally, there is the question of the extent of areas fit for irrigation, and here we are again very much in the dark. Systematic reconnaissance work was only begun a few years ago. It is slow and costly, and during the depressed state of the country this work, though never stopped, has necessarily proceeded very slowly. It is, however, quite impossible to put forward an estimate of the area fit for irrigation. To arrive at even an approximate estimate will take several years' steady work. What I wish to make clear at this stage is that the area of land now fit for irrigation is not unlimited, as many seem to think. With very few exceptions, irrigation will be confined mainly to the alluvium of comparatively modern origin, that is, to the drainage lines of existing or old rivers or vleis, where such land is saved from erosion. The uplands and the higher margins of the valleys are generally useless for irrigation, as the depth of the soil is quite insufficient, and is underlain by rock or by hard calcareous formation. Taking irrigation in its broad sense, enormous good may be done by careful veld flooding, by means of which the depth of soil is increased, sluits are stopped, and a rich clothing of vegetation is secured; but it would take centuries to reclaim ordinary "Gouph" veld or Karroo veld, on anything but a very small scale, sufficiently to make agricultural operations possible. The ordinary individual looks out of the window of the railway carriage, gazes on thousands of square miles of seemingly flat Karroo, and immediately proceeds to moralise about our backwardness in not turning it into waving corn-field by means of water brought from the distant Orange River. I have been urged to prepare schemes for bringing the water of that river to Cradock and to Graaf-Reinet, intervening mountain ranges of great height being considered no obstacle, not the inconvenient fact that water runs down and not uphill. Crop raising by irrigation, to be successful, requires a very definite set of soil conditions and general topographical conditions, and these, in their most perfect form, are rare in the irrigation countries of the world, and very rare in South Africa.

(To be continued.)



Good Slips at Right, Poor Ones at Left.



Slips and Suckers, Stripped and Unstripped.

PINEAPPLE CULTIVATION.—I

(See Article.)

Extermination of the Maize-Stalk Borer.

By J. H. LILIENTHAL.

MUCH has been said in praise of Natal as a maize country, but never was it mentioned how fortunate a circumstance this is; for as far as the Midlands are concerned no other crop can be relied on as to a market, and, next to Kafir corn, with comparative safety as to climate. The more deplorable is the situation when an insect pest like the stalk-borer, which is almost during the whole of its life-cycle within reach to destroy, has not been kept in check, so that now maize culture is almost unprofitable, and the returns will in the very near future not cover half the cost of production. All interested are of the one opinion that something will have to be done at once: in other words, that the policy up to now of evading rather than fighting the insect must cease.

When I wrote on the subject in last September number of the *Journal*, conditions were quite new to me; I trusted that someone more able would come forward with a plan for eradication. The absence of an effective plan, and the absence of a spirit of co-operation, are responsible for the present state of affairs; certainly not that intelligence and enterprise are lacking with South African farmers, as we only too often hear. *Great strides have been made in agriculture in every direction* these last years, and when I bring practical remedies before maize-growers, both inexpensive and quite in the routine of Natal operations, I feel confident that they will be considered at once without the loss of another season.

This year I have obtained more experience in regard to the stalk-borer than I care for. I was able to trace the cause of infection, further found that this is more local, but not so much that co-operation of districts can be dispensed with. During an almost continual residence of fourteen months in Louisiana, U.S.A., planters repeatedly referred me to the cane-borer; taking the position in Natal as stable, I gave it, of course, no second thought. However, I now identified our maize stalk-borer in its life habit with the cane-borer, the best proof of which is the fact that sugar plantations going out of maize for a season or two checked the ravages of the borer. We cannot go out of maize. My first consideration in my plan of extermination was to avoid ploughing, which cannot be done at all times, and the destruction of maize stalks before pasturing in winter. After I solved this question I consulted a few prominent farmers of this locality. They not only highly approved of my work, but stated that they would make use of it next season. It

was from them I learned that the three main features of my plan, burning of the stumps of stalks in spring, insertion of a trap crop (not for certain necessary, as later on will be seen), cutting out of dead hearts and sacking had already been done in the Colony; but that, as the main features had not been combined and acted upon co-operatively, they had not been effective. Considering what had been done in Louisiana, under climatic conditions we in Natal have decidedly the advantage. There the heavy freeze in a wet winter helps greatly to reduce the numbers of the borer, but here we can come with fire up to the time of planting; without loss planting can be delayed; and we have the *true* parasite of the larva to such an extent that, whereas I formerly mentioned the advisability of introducing same, I can now state that other countries can benefit by getting them from us.

It would be confusing if in this article I referred repeatedly to the work of Professor H. A. Morgan, whose authority is guaranteed as he was Entomologist in Charge of the Boll Weevil Commission in Shreveport, La., in 1904, so I will use quotation marks which, whenever they appear, will refer to Professor Morgan's explanations.

Before I describe my remedial measures, which if carefully followed will lead to the extermination of the stalk-borer in one season, I must mention that, when I speak about first and second brood, this does not imply that I consider a third one impossible, though this last one may not complete the life-cycle: I have taken both pupa and one-quarter-grown larva from the stalk on May 1st. The dates for the execution of the work refer to a locality at an altitude of 3,288 feet (Creighton). The word maize (corn) includes those few plants in which the borer has been found—

"For its only food in Louisiana has been found to be sugar cane, corn, Johnson grass, Guinea corn, sorghum (sweet and nonsweet), and possibly two other large grasses,"

and geraniums (?) in Natal. The insect pointed out to me in pig-weed (*mbuya*) is the larva of a snout-beetle. In one instance in geraniums a keen observer states it as green in colour and smaller than the maize stalk-borer, and from this I conclude that it is a distinct insect, probably belong to those species which in the U.S.A. infest tomatoes, potatoes, casters, castor-bean plant, peach twigs, etc., which explains the reason why it is rare in geraniums.

With the exception of a few days when it is in the form of a moth, we have the borer on or in the maize plant. The custom of pasturing the stalks in winter shall not be interfered with, so our work begins in spring with the destruction of those remnants of the plant in which the borer can be found. All stumps in the fields shall be lifted below the roots, and, with any cobs and stalks lying about, piled up and burned. Where stover has been made and cut level with the ground, the

ground should be disked at once and ploughed deep, taking a wide furrow; all cultivation after this must be shallow, and under no circumstances is a second ploughing permissible before planting. Stumps must never be ploughed in: cultivation would bring these up and the moth not dead would escape.

"One hundred stalks of grain containing borers were placed under different varieties of soil, from buckshot to sand, as well as at different depths, from six inches to one-half inch. The results showed that in buckshot soil, well packed by rains, borers died in great numbers, due to exclusion of air. The same results were gotten from placing cane in hermetically sealed jars. Also by immersing the soil planted with borer-infected cane under water. In the coarser grained soils fewer deaths occurred; many of the larvæ reached the pupa condition in March and April, but were unable to emerge as moths even from one-half inch of loose soil."

The stumps below the surface of the soil and the pith of the ears are the places selected by the borer for hibernation; those not finding room there will pass the winter in the stalks above ground. Therefore all maize must be shelled, and the cobs and those found in places where ear-maize has been dumped, about our houses, etc., must be gathered and burned, not forgetting kraals where grain on the cob has been fed to stock: if the cobs are covered with a deep layer of manure, this must not be hauled out and spread before 1st January. Stover not fed and remnants not eaten by stock must be set fire to. All this work must be done before 30th September. Thus no borers and pupæ are left, and we have to deal with those moths which have left the pupa cases before clearing up had been done. The moth is short-lived. I find that in the West Indies its existence covers 2 days, in Java 5 to 12 days, in Louisiana 4 to 6 days. "The length of life of this adult stage is variable, depending largely upon the amount of moisture in the atmosphere." Three weeks will be ample as a period for the moths to die; and, as Kafir corn has to be planted, we can commence the last week in October. We are then free of three stages of the borer: larva, pupa, and moth. We have only to attend now to the first period of its life—the egg-stage. The eggs can only be found on maize grown up voluntarily where grain has been handled: in fields, along roads, near outbuildings and railway sidings. These plants must be cleared away, by cutting out below the roots, and this should be attended to continually till end of October, when the Kafir corn may be expected up. Provided the work has been done conscientiously, the maize stalk-borer will now be a thing of the past; extermination has been accomplished at a trifling cost and without derangement of the work of the farm. September and three weeks in October are not required for planting of maize; owing to scarcity of rain during the next two months it is not a period favourable to the raising of heavy crops, and the harvest falls into the wet season—the great disadvantage of most maize countries. The second and third week in December are too wet during the time of growth when the plant

neither requires nor can absorb such quantities of water, growth is retarded, proper cultivation impossible, resulting in light crops and danger of injury through frost. From this it can be understood that our time for planting is the last week in October up to the second week in December—somewhat more than six weeks. Then we have conditions for maize, climatically ideal and perhaps not equalled, certainly not surpassed, by those of anywhere else in the world.

Though the losses of these last years to growers should be enough to guarantee care in the work of eradication, the responsibility is too great to advise any planting of maize before the usual time—20th November. The Kafir corn will prove if all infection has ended. Any borers which may appear in maize must be removed after the borer has entered the stalk, sacked, carried from the field and buried so that pigs, dogs, rats, etc., cannot make holes for the moths to escape. If burying cannot be done, burning on wood fires, or submerging in pools of standing water can be resorted to: dumping into rivers to drift and land on other farms is little short of criminal. Topping of plants, when larvæ is still in the whorl is not advisable; some borers may be hidden below the part removed; and then there is a possibility of a heavy rain drowning the young borers in this locality, thus saving the plant. The fields should be gone through two or three times, for the plants infected may not all show the dead heart at the time of first culling. We now have dealt with what is termed the first generation; the succession brood need not be considered.

THE PRESENT SITUATION

was caused through increase of the borers, for which the wet seasons lately probably were favourable. The majority of the moths emerge during September and October, less and less during the next two months and remaining unobserved; this time was formerly considered safe for planting. With the borers becoming more every year these stragglers during November and December became numerous too, hence no time is safe now. I entered this locality in 1897, settled within 23,000 acres from which the natives had been moved five to seven years previously. The farmers outside this reserve had but a few acres under maize, planting was done by hand in the plough furrow; the hand-hoe was used in the rows to clear from weeds, and thinning to a stand it is not likely that infected plants were left; between the rows, one-horse cultivators gathering trash necessitated the removal of stumps. The natives broadcasted, weeded and thinned by hand; all parts of the crop in the field not eaten by the stock were used for fuel before spring: thus unconsciously they controlled the borer. An older resident, whose farm is joined by a location, tells me that in 1880 the natives began the last week in August and stopped planting when the wild chestnut trees were in bloom in the natural forest (this is end of October). Later planted

mealies would have been uncertain as to naturing. Grub was unknown in those days. In former days only late varieties of maize were to be met with; they required six months of growing season. With the arrival of the European settlers on the reserve, natives came also, and not only brought grain on the cob but stalks for fuel as well, as no free plantations existed as yet: here we have infection all round from the beginning. Larger areas were put under maize; there were no appliances available to gather the stalks for burning, but the natives did it most economically. Big fields could be seen cleared in a few days for the fuel only and without payment; any place near by, away from traffic and not within reach of fire, was chosen to stack the stalks, to take away when required, and often lying the whole season; leaving no doubt that the moths had made their escape. Then came machines which planted to a stand, no thinning being required, hand-hoeing was not always done, and dead hearts were left standing. Some few modern cultivators which lay off the trash are in the Colony, more will come when the older types wear out and less stalks than ever will be burned! It must be understood, that I do not advocate continual burning, only for one season, or, at the most, two seasons. After this the borer will be exterminated or reduced to harmless numbers. Every grower can then be left to his own devices; all will make the cutting out of borer-infested plants as much a part in maize culture as clearing from weeds is. Burning has been practised in Natal in the past without impairing the fertility as in other countries. A dry winter allows all plant food created through the action of the air to be stored, the rains begin and become heavier as vegetation does, and the plant can take up all food dissolved. While in other countries where rains occur when vegetation is at rest, such a maintenance is not possible even if organic matter is added to the soil: the plant-food washes out and is lost to the later crops.

CULTURAL METHODS.

Some farmers may insist, judging from appearances, that under certain conditions fields will escape the borer. Rotation maize was pointed out; enough borers were proved at once harmful had not the soil been of great fertility; that the adjoining succession maize had more borers and been ruined by them, though planted at the same time was explained; the maize had remained smaller and the moth had the tendency to select the most tender plants to deposit eggs; the surrounding crop had actually saved the rotation field from destruction. The same applies to my experience in cultural methods last season. However, the test had to be made. My arrangements are for a planting time longer than three weeks with a possibility of losing this through rain. A field of 20 acres was drained, ploughed and prepared the season before, without planting any crop. This spring it had all attention; water grass

had still a hold, so that the cultivation of another month before planting would have made it unprofitable and hazardous, the land not having been tested to withstand the wrong planting time practised. Enough to explain the attempt with 20 acres and justify an excuse for the appalling consequences. The maize was planted 3rd November, stand and strength of plants was even when, on 7th December, the first infection was visible; it took a second; a third went into the then up December-planted crop, all of the first brood! After the third cultivation, 2nd January, the plants were eaten down to stumps; 21 acres of Kafir corn planted 21st October was levelled to the ground by the borers; only from the shoots which sprang up some grain will be obtained. Local growers of experience were asked as to the advisability of destroying the remnants, in consideration of a small return in grain. Difficult to remove and impossible to cover with the plough, they were left (the grub must get into the mealie while the plant is still young, otherwise it does it no harm: *Vide Journal*, 1904.)

"After the tasselling of corn the whorl of terminal leaves is gone, and thus freshly hatched borers, unable to find suitable hiding and feeding places, perish in great numbers. This one fact accounts for the limited attack of the borer upon corn after tasselling. 'Bastard ears' and even small normal ears are selected and offer about the only vulnerable places of attack in corn after the tassels are formed. Mature ears have been found invaded by the borers, pith of the cob in such cases marking the position of the burrow."

The correctness of these two statements, both for Natal and Louisiana, is beyond dispute; therefore we now have arrived at a stage of infection without precedent in agricultural history!

Twenty acres with about 16,000 plants per acre containing for each plant, say, six borers, every moth of these bringing "at least 300 eggs," the effect was that on March 18th not only the maize of the 20 acres but the veld planted in December was literally alive with young borers: six were counted in the ear, eating away the milky grain before entering the pith of the cob, 16 in the stalk above the ear, half-grown borers were taken by the handful from each plant. At the time of writing (May) the borers are eating the dry grain in the 20-acre field; in the surrounding fields the grain in some ears has been completely, in others partly, devoured. Where the ear remained intact the grain is light; the cutting of the stalk above the ear before ripeness means 15 to 20 per cent. loss in weight. The stalks are dry and hollow, for want of support they are bending down in all directions, the rind hold them together where cracked: this in a radius of a quarter of a mile, and lessening and disappearing at half a mile.

The field from which infection started, at a corner beacon, has involved three adjoining farms. If the four farms affected do not clean up there will be no maize on them next year, and it is easy to foresee what will be the fate of those farms next to them and the

ultimate state of affairs in this locality, which has always been renowned for maize production. From this last inspection I am of opinion that the pest is local to a certain extent; that in all probability a clean field one mile distant from another field will be quite safe to plant at any time, provided growing maize exists where the moths escape.

"Moths come from the pupa cases at night, and after expanding their wings remain hanging to some plant or other object during the entire following day. The second night mating takes place and a few eggs may be deposited, and for as many as three and four nights following, eggs are deposited in bunches here and there upon plants growing over a radius of not more than twenty to thirty feet. The heavy body of the female (laden with eggs) and her specific habit of remaining quiet during the day, forbids of a very wide infection of a single moth. The moths are not shy and unless vigorously disturbed will not take flight during the day. They have been exchanged from one breeding cage to another upon a piece of cane leaf without ever changing position. This point is emphasised because the wide distribution of the borer in Louisiana is not due to the flight of the moth, but has resulted from exchange of seed (canes—J.H.L.), transporting of infected cane to distant factories, and to the promiscuous carrying of cane from place to place for eating purposes. The writer knows of plantations that are free of borers, not more than a mile away from a badly infected area, which has been more or less so for years. It often happens that all cuts of a plantation are not infected, hence it is possible to more or less confine the attacks of the borer by utilising a knowledge of the moth, and of the real sources of infection.

INSECT ENEMIES.

That maize in new land remains in most instances free of borers is undoubtedly due to the existence of insect enemies, apparently ants, which attack the eggs; yet not visibly infested, unless more closely inspected, the second brood may hatch and complete its life-cycle. The latter may be explained by the fact that during the time of entry we have our heaviest rains these insect enemies have perished or migrated; in short, the land has come to the state old fields are in, or the second brood's large numbers have been more than the insects could cope with.

A number of small silky white cocoons in the burrow of a stalk, along with three worms moving restlessly about, drew my attention, not only on account of the absence of a borer, but the peculiar position and bulk of the cocoons indicated that they had developed in a borer and that the three worms were stragglers searching for food. Soon dead borers were found filled with half-grown worms or pupæ, which left no doubt that here we have a true parasite. On the 30th April some cocoons were placed in a bottle, and from these came, on the 8th May, a *Telmeumon* fly, a black wasp, $\frac{1}{2}$ in. long. After the first discovery the cocoons and infected borers could be taken from the stalks almost anywhere. The value of the presence of this insect cannot be overestimated. It may be argued that, in reducing to practice my plan of extermination, this beneficial insect will also perish. This is not likely, however, as the life-cycle of the two insects is not

completed at the same time, which in this present instance has been shown. No, our work will benefit us twofold: the absence of the borer will force the parasite to other larvæ for a host; for example, the ear-worm, against which pest preventive and remedial measures have not been found up to now.

TRAP CROPS.

Let us now discuss the advisability of inserting a trap crop to be ready the three weeks we allow the moth to die. This could be beneficial only under the supposition that the moth, in absence of growing maize, will lay eggs on the natural grasses of the veld, that hatching takes place, the young borers live in and on the grasses until they do not find room and food sufficient and then go into the, by that time, growing crop of maize. This is the life-habit of the stalk borer in the Corn Belt, U.S.A. It is unlikely that such a change of disposition should occur here; besides, the factors mentioned in new land would be in the veld and prevent development. A trap crop decided upon, it must be planted early, tended as a field crop, and destroyed at the end of October; under no consideration whatsoever should such a crop be allowed to mature.

In conclusion, I would earnestly impress upon all who are really interested in the extermination of a pest that bids fair to ruin the cultivation of maize on anything approaching a profitable scale to carefully select from my article the salient features as applying to the discovery of a parasite—*e.g.*, the larvæ of the Ichneumon fly, an enemy provided by nature to assist man to combat a formidable foe, but one that by itself cannot accomplish its complete destruction. Therefore, the farmer must co-operate with his little friend on the lines already described by doing his part.

Do not try to keep six or eight sows with their litters in the same enclosure; one is enough.

The right to collect rubber in Reserves Nos. XIII. and XIV. in the Province of Zululand, hitherto granted to Messrs. Webb and Ascheim, Ltd., having expired, the Minister of Agriculture is prepared to receive applications from persons desiring to acquire the right to collect rubber upon the said Reserves. For further information as regards terms and conditions applicants should communicate with the Director of the Division of Agriculture and Forestry, Cedara.



PINEAPPLE CULTIVATION.—II.

Parts of Pineapple Plant:—(1) Main Stalk ; (2) Ratoon ; (3) Suckers ;
(4) Head of Fruit ; (5) Slip ; (6) Fruit ; (7) Crown Slip ; (8) Crown,
(See Article.)

Paying for Milk at Cheese Factories.

THE QUESTION REVIEWED.

SOME VALUABLE PROPOSALS.

METHODS of paying for milk at cheese factories have been under more or less constant discussion for about twenty years. Shortly before the year 1890, some question was raised as to the fairness of paying for milk at cheese factories by weight. Two factors worked against the realisation of any practical results coming from such discussion: (1) Lack of knowledge regarding the relation of milk constituents to yield and quality of cheese, and (2) the need of a practicable method for determining any of the cheese-making constituents of milk. In 1890 Dr. Badcock furnished his method of determining fat in milk, and then the discussion soon centred about the use for fat in milk as a basis for paying for milk used in cheese-making; it was known that two constituents are concerned, fat and casein, and the question was therefore more complicated than in the case of butter-making, where only fat is concerned.

During the years 1891 to 1895, a large amount of investigation was carried on, especially at the New York Agricultural Experiment Station, and as a result of that and subsequent investigations some useful conclusions have been arrived at, which are incorporated in a recently issued bulletin of that station, together with some valuable advice on the subject of paying for milk at cheese factories. These conclusions and the advice we publish herewith in a summarised form for the benefit of readers of this *Journal*. Before actually giving the conclusions, however, we may present some fundamental considerations which will enable the reader to obtain a better grasp of the whole question.

The first of these considerations is the relation of fat in milk to cheese yield. It has been found that milk rich in fat usually contains less casein in proportion to fat than does milk poorer in fat. On this account, a pound of fat in rich milk usually corresponds to less cheese than does a pound of fat in poorer milk.

The second consideration is the relation of milk constituents, etc. The relation of milk constituent to composition of cheese. The composition of cheese solids (cheese minus water) depends practically upon the relation of fat and casein in milk. In cheese made from milk rich in fat, the proportion of fat in the cheese solids is higher than in the case of cheese made from milk less rich in fat.

The third consideration is the relation of the composition of cheese to its quality. Other things being equal, cheese containing a high pro-

portion of fat in relation to cheese solids is superior in quality and market value to cheese containing a smaller proportion of fat in its solids. This is supported by the results of the Wisconsin cheese scoring contest of 1908, and by work done at the experiment stations of Wisconsin, Iowa, Minnesota and New York. This view has been supported and advocated by Dr. Robertson and others, of Canada, by Dr. Badcock and Prof. Farrington, of the Wisconsin Experiment Station, and by many others who are recognised as authorities on such questions. While a pound of fat in rich milk is equivalent to less cheese than in the case of milk poorer in fat, the cheese made from richer milk is enough better in quality to make up for the slight difference in yield.

The Bulletin discusses five methods which have been proposed for the purpose of paying for milk at cheese factories, namely: (1) Weight of milk. (2) Amount of fat in milk. (3) Relative values of fat and other cheese solids based on yield and composition of cheese. (4) Modification of fat basis to include part of the milk casein. (5) Amount of fat and casein in milk.

Paying for milk on basis of weight.—Under this system, each patron receives the same amount of money for 100 pounds of milk. While this method possesses the advantage of convenience and simplicity, it is open to the following objections: (a) It is unfair to the producer of richer milk. (b) It discourages progress in the production of better milk. (c) It encourages the watering and skimming of milk. (d) All things considered, it is the poorest possible method of paying for milk for cheese-making.

Paying for milk on basis of milk fat.—On this basis, each patron receives the same amount of money for each pound of fat in milk delivered by him. This method is objected to by producers of milk that is low in fat mainly on the ground that the percentage of fat in milk is not generally a strictly accurate measure of the amount of cheese made from 100 pounds of milk. Objections other than this, so far as they are worthy of consideration, have been easily met. This system possesses the following advantages:—(a) The amount of fat in the milk offers a practicable and just basis for ascertaining the cheese producing value of milk when we consider both quality and quantity. (b) The method eliminates all temptation to skim or water milk. (c) It encourages improvement in the character of milk production, which results in economy of production and increased profit. (d) It tends to raise the production and care of milk to a higher plane of intelligence.

Paying for milk on basis of cheese yield and relative value of cheese solids.—The method was proposed by Dr. Badcock. It considers the yield of cheese from different milks and the composition of the cheese—solids, allowing for fat a value of 6.6 as compared with a value of 1.0 for the cheese solids other than fat. Values are worked out which give

figures, to be used in making dividends, corresponding to varying percentages of fat in milk. The chief objection urged against this method is that it requires, in addition to the fat test, a determination of the specific gravity by the Quevenne lactometer. It possesses the general advantages offered by the simple milk fat basis.

Paying for milk on the "fat plus two" basis.—By this method the percentage of fat is increased by two and the results used the same as in making dividends on the fat basis. This system is an attempt to approximate the yield of cheese as a basis for making dividends. It allows payment for two pounds of casein in addition to fat in the case of all milks. The following objections are made to this method: (a) It considers yield of cheese alone and not quality. (b) It does not recognise any casein in milk above 2 per cent., though milks richer in fat are known to contain, in general, more casein than milks containing less fat. (c) This method is in the interest of the producer of poor milk at the expense of the producer of rich milk. (d) It offers a premium on watering and skimming milk. (e) It is in opposition to the teachings of Robertson, Badcock and many other recognised authorities, so far as it works in favour of poor milk at the expense of richer milk.

Paying for milk on basis of fat and casein.—Under this system the percentages of fat and casein in each patron's milk are added and the figures thus obtained are used in distributing dividends. This method has the advantages of being an accurate measure of cheese yield and of removing temptation to water milk. It has the following disadvantages: (a) When carried out in the most complete manner, it involves making a casein test in addition to a fat test, requiring extra time, labour and cost. (b) It does not recognise any difference in the quality or value of cheese made from milks containing different percentages of fat. (c) It offers a temptation to skim milk. (d) It takes the value of casein on a par with that of milk fat, contrary to the teachings of Badcock, and encourages the production of milk with higher percentages of casein relative to fat. (e) From results obtained in applying this method to data obtained in case of a representative New York cheese factory, the charges made in the distribution of dividends would be insufficient to justify the extra expense involved in making a casein test, in comparison with the milk fat basis.

Modification of fat and casein basis.—If casein were assigned one-fourth the value of milk fat, in harmony with a Badcock's relative value plan for cheese yield and solids, and if this value, added to that of milk fat, were used in making dividends, we should get results essentially like those given by the milk fat basis. Under such circumstances, the cost of making a casein test would be practically thrown away.

Payment on basis of milk fat and calculated casein.—The percentage of casein in milk can be approximately calculated when the per-

centage of milk fat is known. Casein thus estimated could be used with fat in making dividends without the cost of a casein test. Such a method considers only quantity and not quality of cheese, but, apart from this fundamental weakness, possess the following advantages: (*a*) It is preferable to the fat and casein method, in that no extra expense is required for making a casein test. (*b*) It is more fair than the "fat plus two" method, since richer milk would be credited with more casein than poorer milk. (*c*) All temptation to water or skim milk would be wholly eliminated. (*d*) No additional labour is involved in making dividends, as compared with the milk fat basis.

As a result of his examination of these five methods of paying for milk for cheese-making purposes the writer of the Bulletin offers the following suggestions—which, though, of course, made primarily to dairy farmers in New York State, are equally applicable to South Africa:—

(1) The exclusive use of the milk fat basis is advised, since it is the method which takes into consideration *composition and quality* of cheese in connection with *yield* of cheese, thus providing an equitable and simple system.

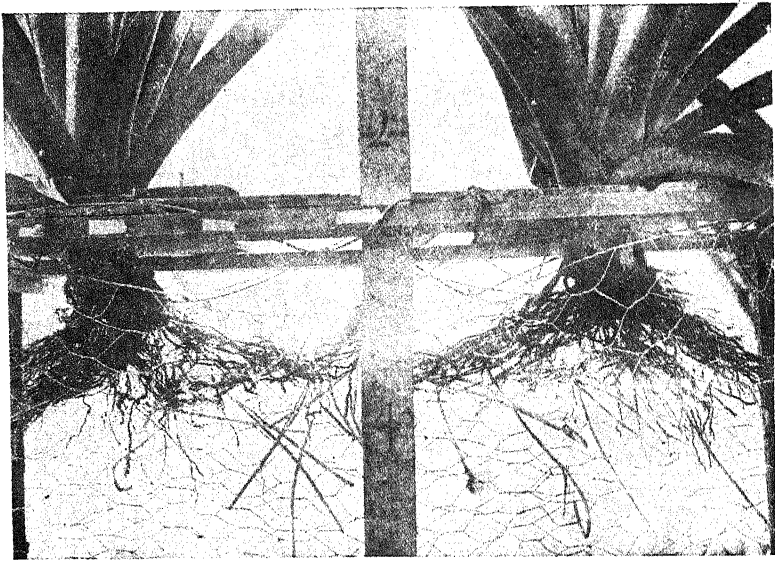
(2) The method of distributing dividends on the exclusive basis of the weight of milk delivered should be abolished, since it is open to many objections of the most serious character.

(3) In those cases in which it is found impossible to introduce the milk fat basis, any of the following methods will be found greatly superior in fairness to the weight-of-milk system:—(*a*) Relative values of fat and other cheese solids, based on yield and composition of cheese, as proposed by Badcock; (*b*) amount of fat and calculated casein in milk; (*c*) fat plus two.

(4) The cheese-makers of New York are advised not to attempt to introduce any method of testing for casein until its practicability has been fully established beyond all doubt.

Much sickness among hogs is due to unclean quarters, wet pens and exposure.

A Bill "to provide for the construction and working of a line of railway from South Shepstone to Murchison Flats," to be introduced into Parliament during the present Session, was published in the *Government Gazette* of the 1st June.



PINEAPPLE CULTIVATION.—III.

Normal Root Systems of Pineapples.

(See Article.)

Pineapple Cultivation.

By H. C. HENDRIKSEN and M. J. LORNS, *Horticulturists, Porto Rico
Agricultural Experiment Station.**

THE pineapple plant consists of a short stem covered with leaves, arranged in whorls, and supported by the roots, which are directly attached.

ROOT.

The roots are fine and branched or in single strands of as much as one-eighth of an inch in diameter, according to the conditions under which they are formed. In water cultures or in mellow soil of a uniform moisture the roots develop in fine strands which branch and reach out like the roots of other similar plants. In heavy soils or in extremely dry soils the roots are more or less coarse and usually not much branched; such roots may attain considerable length, however, and often wind around the stem of the plant instead of spreading horizontally in the soil. This is especially so with old plants which have produced several crops of suckers and to some extent with large suckers remaining on the mother plant, although these roots, while they are usually unbranched, will be found to develop in the leaf axils of the mother plant. These roots are feeding roots; if a sucker is planted in the soil immediately after removing from the mother plant, the roots will continue to develop, whilst the fine-branched roots developed in the soil often die on removing the plant. Therefore, there is not much gained in transplanting old plants with well-developed root systems.

LEAF.

The leaf of the pineapple plant is in some varieties nearly smooth, while in others the margins are covered with spines. The spines were undoubtedly intended by Nature to be a protection against enemies, but in cultivated fields the only enemy from which they could protect the fruit is the rat, and it always seems able to get its share of the best pines. All other factors being equal, the spineless variety is much preferable to those with spines, and considerable progress has been made by the United States Department of Agriculture in eliminating these by crossing the spineless variety with some of the others. It is quite possible that the same result could be obtained in the West Indies by rigid selection. Some plants of the Spanish variety brought from Florida showed a number of perfectly smooth plants in the first generation, but, as far as observed, they developed spines in the following generation. To show what an

* Being a Summary of Bulletin No. 8 of the Porto Rico Agricultural Experiment Station.—ED.

inherent characteristic the spines are, a number of leaves were split longitudinally and spines developed on the cut margins.

The colour of the leaf varies from red to red striped, and red and white striped to dark green, the last being the predominating colour. The dark-green colour is a sign of health in most of the varieties, and whenever the leaves, which are nominally green, turn reddish it is a sign of some derangement.

FLOWER AND FRUIT.

The pineapple is a multiple fruit; that is, the fruit which we know as a pineapple is really an aggregate of many individual fruits, the number of which determines the size of the pineapple. At a certain period in the life of the plant the heart—that is, the last-formed leaves—will assume a bright red colour, and instead of more leaves forming, the flower head will appear on a stalk which is a direct elongation of the plant stem. The flower heads are rather conspicuous, being covered with the bright-red flower bracts. The flowers, which are inconspicuous, are of a violet or purple colour. In developing, the flower head loses its bright-red colour, and the terminal bracts form the rosette on top of the fruit that is called the crown. Later buds may appear on the stem below the fruit which develop into slips.

PROPAGATION.

The plant bears but one fruit, and the next crop must be produced by a new set of plants. There are several different parts from which the pineapple may be propagated, all of which are quite similar. All are miniature plants, and are known under different names according to their position on the mother plant.

RATOONS AND SUCKERS.

At the time the fruit is forming buds appear on the stem among the roots as well as in the leaf axils. These buds develop into individual plants, and those which are formed below the soil are called "ratoons," while those in the leaf axils are called "suckers." Either of the two forms soon develops roots, and as the roots of the ratoon develop directly in the soil, it will soon be independent of the mother plant and can be left to continue the field. The sucker, if left on the mother plant, also throws out roots, but, as it is not in contact with the soil, the roots develop partly around the base of the new plant under the lower leaves and partly in the leaf axils of the mother plant. In that position the sucker will grow and bear fruit exactly as if the roots were taking nourishment from the soil. The nourishment may in this case be taken up by the roots from the leaf axils where they are developing or through the stem by which the sucker is attached to the mother plant. It has been proved that the sucker grows as well after severing the connection with the mother plant as before, showing that the roots are actually

taking up nourishment, though not in connection with the soil. The practical importance of this is that where the plants are close enough together to prevent the suckers from being blown over they can be depended on to bear a crop of fruit. Both the ratoons and the suckers can be severed from the mother plant at any time and used for planting.

SLIPS.

The plantlets appearing on the fruit stalk below the fruit are called "slips." They are similar to the ratoons and suckers, but they seldom attain the size of those while attached to the mother plant, and they can not reach maturity and bear fruit without being planted, as they have no chance for root development.

CROWN AND CROWN SLIPS.

The rosette of leaves on the apex of the fruit is called the "crown." (This is similar to the slip, and when cut off from the fruit and planted it will grow and produce another fruit.

Frequently, and especially in some of the varieties, a number of slips will be found beneath and around the crown; these are called "crown slips." They are usually small because they do not have time to develop; they can be used for propagation, however, if other slips can be obtained.

SEEDLINGS.

Practically all varieties of pineapples produce seeds in the West Indies. The quantity produced varies in the different varieties and apparently depends on the locality as well as the season. In the experimental plots on the station grounds we have frequently found fruits so seedy that they were almost inedible. The seeds germinate freely, but not very quickly. The plants develop slowly until they reach the size of a small slip; after that there seems to be no difference in growth.

In propagating from seeds, plant in boxes under cover, use light soil, and cover the seeds lightly. The seedlings are subject to damping off, and it may often be necessary to sterilize the soil before planting. After the plants attain the size of small slips they can be set out in nurseries and later transplanted into the field. Seedlings will bear in from two and a half to three years, while slips bear in about one year and a half, showing that it is not practicable to propagate from seed, but it is of great importance in developing new varieties. The seeds do not reproduce the variety true to name, and in propagating from seeds the result is a number of different types, some of which may be equal to the parent, some inferior, and some superior.

SELECTING PLANTS FOR PROPAGATION.

In growing pines, the first consideration is that the plants must be free from disease, strong, vigorous, and mature. A well-matured sucker or slip can be pulled off and left exposed to wind and sun and

even moisture for a long time, whilst the immature plant will dry up in a short time, or decay if the air is laden with moisture. There is no essential difference between a ratoon, a slip, and a sucker. Suckers often develop on the mother plant before the fruit, and such suckers will therefore be several months older than the slips and, consequently, when planted will bear several months earlier than the former.

Ratoons, although they have developed root system, are not to be preferred to slips, because their roots die unless the plant is removed with a ball of earth. Plants in any stage of growth may be transplanted, but old, rooted plants should never be accepted in lieu of suckers. Crowns are frequently used where they can be obtained from canneries, and, if large and well matured, there is no objection to planting them. The small, immature crowns are subject to rot, especially in rainy weather, and often the loss is very great. When crowns are to be planted, two precautions are necessary to avoid loss. The first is to trim close to the base of the crown. The second, to "cure" the ends by exposing for several days until there is a dry, hard surface formed. This is best done by setting the crown base up, where the exposed surface will receive the full sunlight, which will dry out the moisture.

SOIL AND ITS PREPARATION.

The three requirements of the pineapple plant are that the roots must have a limited amount of water, the necessary supply of plant food, and an unlimited amount of air. It will be understood that a well-drained sandy soil in which the individual soil particles are coarse fills some of the requirements. It will need frequent stirring of the top soil until the plants become large enough to shade and protect it from evaporation. The plant food, of course, will have to be supplied.

In clay soil and in loam and even in fine sand the conditions are not so readily controlled. A heavy rain will pack the surface, excluding the air from the roots, and, unless the land is bedded, the water is likely to remain in the soil long enough to cause serious injury to the roots.

Aeration is really the underlying principle of pineapple cultivation. The pineapple plant is not adverse to water, but the water, when filling up the soil, excludes the air. We have grown plants in jars of water for months and found the root development to be vigorous and healthy and the increase in weight of the plant equal to plants grown in soil. We have also grown plants in tubes filled with gravel previously washed with hydrochloric acid and distilled water and in similar tubes which were perfectly empty, and we found that by watering every day with a very dilute plant-food solution roots were developed and the plants increased in weight, not alone in the tubes containing gravel, but also in those which were empty and that served



PINEAPPLE CULTIVATION.—IV.

The Pineapple in Fruit.

(See Article.)

only to support the plant and protect the roots from light. These methods are not recommended as practical, but they serve to illustrate the nature and requirements of the pineapple plant. Methods quite similar are followed on the Florida Keys, where pineapples are often planted in a few inches of leaf mold on top of the bare coral rock, and whenever the amount of soil is insufficient to support the plant a few pieces of rock are used to hold in place. Under such conditions pineapples will grow and produce fruit until the leaf mold is all exhausted. The reason for not producing longer is not so much the lack of soil for root formation as the exhaustion of plant food. This is further illustrated in the pineapple regions in Florida, where the soil only serves as a support for the plant and all the necessary plant food must be added. These are some of the things known, but in applying this knowledge locally it is often found that there are other conditions which we are not yet able to explain. For instance, one soil may to all appearances be physically suited and yet be a failure, while another may seem to be anything but a pineapple soil and yet produce a satisfactory growth of plants and yield of fruit. It is therefore never safe to say that a field will or will not produce pineapples before making a practical test.

The amount of preparation needed and the methods to be followed will depend entirely upon the class of soil selected.

SANDY SOIL.

Sandy soils are those in which sand predominates. Such land, if it is new—that is, has not been under cultivation for many years—is usually free from obnoxious grasses, and the first preparation will be to clear off the trees and shrubs, if any, and plough it to kill the vegetation. In a few weeks the sod will be decayed and the land can be worked with a harrow or any other tool suitable for fining and smoothing. After that the beds may be laid off according to the system of planting desired.

CLAY SOIL.

A clay soil is one that consists almost entirely of clay. Such land, although it may not be under cultivation at the present time, has frequently been cultivated within the last generation, and often contains noxious weeds, such as malojillo grass, Bermuda grass, nut grass, etc., and it is essential that all weeds and grasses be eradicated before planting pines. Of course it is practically impossible to eradicate nut grass, but wherever the soil is full of it planting pines is not to be recommended. The preparatory step, as with sandy land, is ploughing. If it is in the rainy season, it will be useless to try to eradicate malojillo and Bermuda grass, and it will save work as well as greatly improve the soil to plant a cover crop which is known to grow vigorously in the locality. Such a crop will often entirely kill out the weed and,

when ploughed under, will add humus, which is much needed in these heavy soils. If it is in the dry season most of the weeds can be eradicated in a few weeks by harrowing, which exposes the roots to the sun, and by gathering up and carting off some of the material if it does not dry fast enough. But under all conditions the first and absolutely essential thing is the eradication of all joint grasses before planting. The next thing is fining and smoothing of the soil. A pineapple bed should be loose, porous, mellow, and free from clods.

(To be continued.)

Alcohol for Internal Combustion Engines.

POSSIBILITIES OF ITS MANUFACTURE IN NATAL.

By CHAS. W. PETCHELL.

At present there are only about four stills in Natal capable of making strong enough spirit for motors by direct distillation—*i.e.*, without rectifying it. Of these only one—*viz.*, that of the Natal Chemical Syndicate at South Coast Junction—makes a pure enough spirit.

As the output of sugar in Natal is increasing by leaps and bounds, the supply of treacle is increasing. Last year there was manufactured in Natal approximately 45,000 tons of sugar. This means that there was about 3,000,000 gallons of treacle made. Of this there is no doubt that a large amount was wasted. A certain amount was sold to natives, some was made into rum, whilst a considerable quantity was shipped Home. I am strongly of the opinion that it would pay much better to make it into a motor spirit if once the public could be got to use it.

With the latest plant, one gallon of 65 over proof spirit can be made from two gallons of treacle. If we take it as three gallons, there is enough treacle manufactured to make one million gallons of motor spirit yearly. And each year this amount is increasing.

After an experience of over five years with the use of denatured alcohol in motor car engines, I unhesitatingly say that it can be used in place of petrol in engines of the ordinary type, provided that a suitable carburettor or vapouriser is used. In many cases the existing one

may be altered to give perfectly satisfactory results. There are certainly some drawbacks to its use, but they are not insuperable, whilst on the other hand it has some decided advantages. Many of the objections alleged against it are merely bogeys.

What appears to be the most serious drawback is the action of the acid fumes set free on the explosion of the charge. This is not noticed if the engine is worked daily. But the metal of exhaust valves and seats is certainly affected if the engine is simply stopped and left alone for some weeks. This difficulty is easily overcome by injecting paraffin into the cylinders whilst hot and giving a few turns by hand. When this has been done the signs of corrosion are entirely absent even after a stoppage of several months.

On the other hand there are certain decided advantages in its use. The engine runs more freely, there is practically no pre-ignition, the engine develops more power, whilst the exhaust fumes are not nearly so objectionable as from petrol.

It must be thoroughly understood that only pure alcohol of not less than 65 over proof should be used. A great deal of spirit which is denatured and sold as methylated spirit in Natal is very corrosive and utterly unsuitable for motor work. I have found that with impure spirit a soapy, slimy growth or deposit forms on the tank and on any gauze strainers that may be used, besides choking up any of the small copper pipes which convey the spirit to the carburetter. Impure spirit also corrodes the tank and any metal with which it may come in contact. I feel that I cannot too strongly emphasise the necessity for using only a pure spirit. In fact a stringent inspection before allowing it to go on the market is just as necessary as in the case of fruit or mealies for shipment.

To compete with petrol at its present price in Natal, viz., 1s. 6d. per gallon, denatured alcohol should be sold at not more than 1s. per gallon at the outside. It could easily be sold at that price and a fair profit made, and could be sold at considerably less if the most suitable denaturant "benzol" was made in the Colony, and there is no reason why it should not be.

To make the industry a success central stills of the best and latest designs should be erected to which the planters could send their treacle, or a crude spirit could be made on the estates and sent to a central still to be rectified or redistilled.

I shall be very glad at any time to give any information in my power to any one interested in the industry.

In conclusion, I must express my sincere thanks to Mr. Geo. Mayston, the Controller of Excise, who has done everything in his power to help me in my experiments and who is greatly interested in the success of the industry.

Hemp and Its Cultivation.

By Lyster H. Dewey, *Botanist in Charge of Fibre Plants,*
*U.S. Department of Agriculture.**

MOST of the hemp cultivated in this country (U.S.A.), amounting to from 15,000 to 20,000 acres annually, is grown in the blue-grass region of Kentucky, of which Lexington is the centre. About 600 acres are grown each year near Lincoln, Nebraska, and an area of about the same size in the lower Sacramento Valley in California. During the past two years hemp had been grown successfully at Hanover, Pennsylvania. It has also been grown experimentally in Northern Indiana, Wisconsin, Michigan and Minnesota.

SOIL.

Hemp requires for its best development a rich, alluvial, or loamy soil, not subject to severe drought yet not of a swampy condition. I would not recommend hemp for a light sandy soil, unless it followed a crop of clover or beans which had left a plentiful supply of nitrogenous fertiliser. The soil should also be well supplied with lime. Hemp will not grow well in an acid soil, or on gumbo soils. Good results have been obtained in Indiana during the past season on peaty soils over marl.

CLIMATE.

Hemp requires about 90 days for its growth. It should have a rainfall of at least 10 inches during this period. It has never been grown under irrigation. If the level of free water in the soil is within ten feet of the surface, as is often the case in alluvial-bottom lands, and the character of the soil is such that there is good capillary action to bring the water up, hemp will not suffer from drought, even should there be very little rainfall. Hemp is uninjured by light frosts. It may therefore be sown earlier than oats and harvested later than corn.

The best fertiliser for the hemp crop is barnyard manure, and this should be applied to the previous crop, or, at the latest, in the fall before sowing the hemp. Hemp may be introduced in any crop rotation, but it is best to have it follow peas, beans, or clover. It may follow corn or grain, providing these crops are well fertilised. The dense growth of hemp destroys nearly all weeds, and as it is a rather deep rooting plant and shades the soil it leaves the land in excellent condition for any crop which may follow.

* Specially written for Mr. J. Medley Wood, Director of the Natal Botanic Gardens, who has forwarded it to us for publication.

SOWING.

Hemp seed should be sown at the rate of about one bushel per acre at about the time of sowing oats, or as early as possible after the period of severe frosts. The land should be ploughed, if possible, during the previous fall. Fall ploughing is essential for success if a heavy sod or much vegetation is to be turned under. It should be harrowed at least once before seeding, in order to settle the furrows. The seed may be sown by a hand seeder, such as the Cahoon, an end-gate seeder, a roller-press grain drill, or an ordinary toothed grain drill with the teeth removed and replaced by a board dragging on the ground below the feeding tubes. The seed falling on this board will be spread out evenly over the surface. The ordinary teeth cover the seed too deeply, and they crowd them in drills 6 to 8 inches apart, so that the hemp does not grow as evenly as when it is spread over the entire surface. The seed may be covered with a light straight-toothed harrow. Drills made especially for sowing hemp seed are also on the market and they are largely used in Kentucky. After seeding it is best to roll the land in order to have a smooth surface, permitting close cutting with machinery. After seeding, the crop requires no further attention until harvesting.

HARVESTING.

Most of the hemp is now cut with self-rake reapers, made especially for cutting hemp by the Deering Harvester Company, of Chicago, and the Osborn Harvester Company, of Auburn, New York. These machines require two men, or a man and a boy, and four horses for their operation. They cut a swath of about five feet, or about five or six acres per day. They leave the hemp stalks in gravels. After lying in the gravel for two or three days the stalks are bound into bundles, and set up in shocks to dry. After curing in the shock for three to five weeks the stalks may be stacked. Stacking is not regarded as a necessary step in the preparation of hemp, but a greater weight of fibre and also a better quality are obtained from stalks which have been stacked. If the stacks are properly made they may be left almost indefinitely before retting. Three men will put up two stacks a day of about 15 tons.

In Nebraska the hemp is cut with a mowing machine with a special home-made attachment, bending the stalks over in the same direction that the machine is cutting. One man, with one span of horses, will cut from 7 to 9 acres per day. The ordinary price paid there for cutting hemp is 50 cents per acre, including team and machine. The hemp is there left on the ground as it falls until retted, when it is raked up with a horse rake and hauled to the machine brake to be made into long tow.

RETTING.

Practically all of the hemp produced in Kentucky is dew retted. It is spread on the ground, either from the shock or from the sack, in rows

with the stalks side by side, and not more than two, or at most three, stalks in thickness, the butts all even and in one direction. It is left in this manner for 4 to 12 weeks, or sometimes even longer, until the bark, including the fibre, separates readily from the woody portion of the stalk. The stalks are then raked up and set up in shocks to dry. As soon as dried they are ready for breaking.

BREAKING.

Most of the hemp produced in Kentucky is still broken by the old-fashioned hand-brake, but I would not recommend this method for introduction into any new locality because it requires a degree of skill that would be difficult to secure in labourers not accustomed to the work. Even in Kentucky the newer generation of labourers do not learn to break hemp, and this is one of the principal reasons that the industry is not carried on there to a greater extent. Machines for breaking hemp and preparing the fibre are made by the following companies:—Universal Fibre Company, Chicago, Illinois; Kentucky Hemp Brake Company, Cynthiana, Kentucky; Horine & Welch, Nicholasville, Kentucky. The machine for ramie, made by Mr. George William Schlichten, 473, Broome Street, New York City, also does excellent work in the preparation of hemp fibre.

At Havelock, Nebraska, and at Courtland, California, there are power machines consisting essentially of a series of fluted rollers, somewhat like a jute softener followed by large beating wheels, and these machines make long tow. They will handle a greater variety of different sizes of hemp stalks in a satisfactory manner than the other machine brakes, but as the fibre is tangled instead of being straight it does not command as high a price as that produced by the hand-brakes, or by other machine brakes mentioned.

Hens forced for egg production will in time produce a weak generation. Pure food is the safest stimulation to use.

One point the farmer should remember, and that is, the wool-buyer knows infinitely more about wool than he does, owing to the fact that the farmer generally sees his and his neighbours' clips but once a year, while the buyer has wool passing through his hands almost every day in the week at certain seasons of the year.

Condensed Milk.

HOW IT IS MANUFACTURED.

THROUGH the courtesy of Messrs. Joseph Baker & Sons, Ltd., Willesden Junction, London, Mr. Francis Harrison, the Natal Commercial Agent in London, has been able to furnish us with the following memorandum on the subject of milk condensing, which should prove of interest to readers of the *Journal*:—

We have pleasure in sending you herewith some general information with regard to milk condensing plant, and hope that you may find same of service.

We gather from the figures sent us that the average yield of milk per cow is about 4 gallons. The smallest size plant which we make has a capacity of 50 gallons per operation—i.e., it will do 150-200 gallons in the ordinary working day. The operation takes about 2 hours to complete, and the proportion of condensed milk to fresh milk is from one-third to one-sixth. Therefore, 200 gallons of milk per day would give us about one thousand $\frac{1}{2}$ -lb. tins of milk. The operation is as follows:—

The milk, as it is received at the factory, is tested and checked for quality and measure, and is then passed through a steriliser, where it is raised to a temperature just below boiling point in a thin film and thoroughly sterilised. From here it is delivered automatically into steam jacketted copper pan, where it is re-boiled, and, if sweet milk is being made, the sugar is added. It then runs to a tank under the vacuum condensing machine. This consists of a copper cylinder, furnished with tinned vertical tubes of a large diameter at its lower part, surrounded by steam passages. The milk is very rapidly concentrated and the steam is drawn away by the air pump through the surface condensor. This condensor is of the ordinary type such as are used in steam engine work and therefore does not require any description. The milk is concentrated to from one-fourth to one-sixth of its original volume, and before being withdrawn from the pan small portions are taken out through the tester valve in order to test the density. As soon as this is right it is drawn off and run into large cylindrical cans, which are put into a tank and revolved slowly while the milk is stirred with wooden spaddles to ensure even cooling throughout the mass. When properly cooled the can is taken out and the milk emptied into the hopper of a small hand-filling machine, and the tins are filled, sealed, and despatched.

The process of milk condensing seems to us to lend itself par-

ticularly well to co-operative working. One small plant placed in some accessible position on the borders of a few farmers keeping cows could be very economically worked. The plant is simple to work by anyone who has had previous experience or training, but it is important that the temperature, vacuum, etc., should be kept exactly right. A difference of one or two degrees in temperature is sufficient to alter the quality of the milk, and we should certainly advise that a skilled assistant should be sent out to assist in the erection and starting of any plant that went out.

The plant requires no special building. Any cool building that would be suitable, for example, for dairy or storing milk could be quite well used. It should, of course, be under cover, and the floor of the room in which the condenser itself is placed should preferably be made of cement or tiles and arranged so that it can be washed out and drained. Cleanliness is absolutely essential if the milk is to be turned out sterile and is to have keeping qualities.

A certain amount of water is used for condensing purposes. This, however, is not damaged in any way by passing through the condenser and could be used afterwards for drinking or any other purpose.

The number of men required to work the plant would be two, and the assistance of a boy or girl for filling would be required.

Condensed milk, properly prepared, lasts a very considerable time, and the sweetened milk should keep a year. Unsweetened milk is usually reckoned to keep a rather shorter time, say, six to nine months.

The following is a list of the machines of which the small plant referred to is composed:—

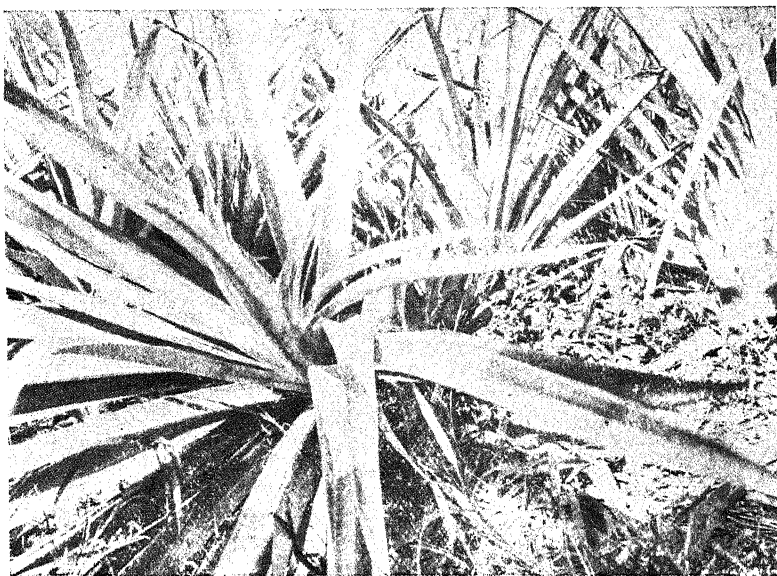
- 2 Galvanised feed tanks.
- 1 Pasteurising machine.
- 1 Copper boiling pan.
- 1 Condenser.
- 1 Surface condenser.
- 1 Air pump.
- 1 Cooling machine.
- 1 Hand-filling machine.

Total cost of plant, about £420, f.o.b. London.

Total weight of plant, 4½ tons.

Total measurements, 275 cubic feet.

"The sow that is a good breeder for one year is worth keeping. She will probably be good for many more."



PINEAPPLE CULTIVATION.—V.

Plant fallen over, due to lack of support in wide planting.

(See Article.)

Locust Destruction.

REPORT FOR THE SEASON, 1908-9.

By ALBERT KELLY, F.E.S., Assistant Entomologist.

A SUM of £1,000 was voted by Parliament for the 1908-1909 locust campaign, an amount entirely inadequate to deal effectually with an invasion of any magnitude. Fortunately, however, last year's infestation was very slight, and by dint of exercising the most rigid economy in the working of the campaign the expenditure in connection therewith was less than that voted, only £770 being absorbed in the actual working expenses of the campaign, *i.e.*, apart from arsenite of soda and spray pumps. I would point out, however, that Government cannot hope to always cope so successfully with the pest as was done last year, at this cost. As a matter of interest it may be stated that the planters in the neighbourhood of Tongaat, where sugar cane is largely grown, report that last season's hatching was the heaviest experienced for the last eight or ten years.

Locust officers were appointed for the Tongaat, Stanger, Lower Umfolozi, Eshowe, Melmoth, Ngotshe, Umkomaas, Umlazi, Umzinto, and Port Shepstone districts, the first of the eighteen officers employed assuming duty on the 14th of December. The work from then on to the middle of March proceeded with the utmost smoothness, and the respective districts were almost totally cleared of the young hoppers.

ASSISTANCE.

In previous reports it has been a pleasurable duty to refer to the generous assistance rendered this office by the officers and men of the Natal Police, and this year our indebtedness is, if possible, increased over past seasons. One of the force acted as active Locust Officer for the Melmoth district this year, and, by special arrangement with the Chief Commissioner, we will next year be enabled to extend the scope of our operations so as to include the far north of Zululand. Such work as is carried out here will be of the greatest help in our efforts to control the ravages of the locust plague. The country referred to is of a somewhat swampy nature in parts, as well as being quite isolated, and the high rates of pay demanded by men to proceed there have put an effectual barrier to any work being done departmentally in the past.

Most of the locust officers employed this year were working directly under this office, and not under the immediate superintendence of the Magistrates of the respective districts, as has often been found necessary.

This office is happy, however, in the knowledge that it can, at all times, depend upon the utmost assistance and courtesy being extended to it by these officials when required.

The Department was again fortunate in its choice of locust officers this season. The men filling the positions were, in many cases, prominent men having personal interests at stake in the district over which they were placed, and who looked upon the successful working of the campaign in their respective districts as something for which they personally were responsible.

For many years past Mr. R. Parkin has taken the greatest interest in the locust question in this Colony, and for the past two seasons has shown his practical sympathy in the work by acting as Chief District Locust Officer in an honorary capacity. It is to Mr. Parkin that the good work accomplished in the Lower Umkomaas district has to be credited, and this office is deeply indebted to him for the whole-hearted assistance which he has at all times rendered.

DEGREE OF INFESTATION.

On reference to my report for the previous season, it will be seen that 43 officers were employed that year against the 18 men working this year, but it is to be remembered that 19 districts were then infested against the 10 involved this year. Again, several Divisions which employed three, four and even five men last year were effectually cleared with half the number of men, and this can be read as indicating the efficient way in which the work was done last year, and the value of its accomplishment.

CO-OPERATION OF NATIVES.

But little difficulty was experienced in enlisting the natives' sympathy and services, and several of our Locust Officers have testified to the great assistance rendered by them in the work. This is, of course, as it should be, but it is nevertheless gratifying to note that that which was once given with a very bad grace is now tendered with alacrity.

CONCENTRATED LOCUST POISON A SUCCESS.

The outstanding feature of the campaign has been the general approval by the locust officers of the concentrated locust poison supplied them. This innovation, so far as Natal is concerned, was the outcome of the suggestion and experiments carried out by Mr. C. P. Lounsbury, the Government Entomologist of Cape Colony, and detailed in the second annual report of the Central Locust Bureau. The arsenite was incorporated with treacle and put up in cases each containing four 1½-gallon drums, the contents of which were capable of being diluted down to 316 gallons of water. Such success has attended its use, and of such convenience has it proved, that it is the intention of this office to distribute the poison in this form in all its future work.

NATURAL ENEMIES.

Parasites were again our very efficient allies in the work of locust destruction, but the fungus does not seem to have been so generally prevalent as it was last year. Locust birds were, however, as avenging and ravenous as ever, and two of the districts were closed up owing to the fact that the birds were reported to be doing better work than our officers could ever hope to accomplish.

CLERICAL WORK.

A great deal of time was occupied last season in connection with the bringing up to date of the stores book. The tracing of the unrecorded issues and returns of the stores was a matter of considerable difficulty and occasioned voluminous correspondence. The matter has, however, now been brought to a successful conclusion.

COMING SEASON'S PLANS.

Arrangements have already been made for dealing with this year's infestation, and supplies of concentrated solution and such other stores as are necessary for the prosecution of the work have been ordered forward to the outlying districts. Ample supplies of arsenite have been laid in and a further supply of pumps obtained, the cost of both of which is being met from this financial year's votes.

The comparatively light season of 1908-1909, combined with the thorough work then accomplished, encourages one to anticipate but a slight infestation in the coming season, and to hope that the otherwise inadequate sum voted for the service (£1,000) will enable us to again bring the work to a successful conclusion.

One of the very best feeds to give the skim milk calf is oats chop. Throw a little dry chop in a box and allow the calf to eat of it whenever it desires. Gradually increase the amount as the calf grows older.

With effect from July 1st, 1909, small consignments of South African firewood conveyed between N.G.R. stations will be charged at the same rates, and under the same conditions, as now apply to small consignments of South African coal, *vide* page 43 of Goods Tariff Book No. 22.

Intensive Fruit Culture.

LECTURE BY MR. A. P. SMITH.

AN interesting lecture on intensive fruit culture was delivered on Saturday, 22nd May, by Mr. A. P. Smith, the Secretary of the Pietermaritzburg Horticultural Society, before the Durban Technical Institute.

There was a large audience, presided over by the Ven. Archdeacon Gregson.

The lecturer, in his introductory observations, remarked that the little knowledge he had to place before them was largely the result of observation provoked by many failures and encouraged by a few successes. His efforts had been necessarily restricted to spare moments and short holidays, and his experiences were consequently limited to those of the average amateur or hobbyist.

Proceeding with his subject, he said that the inculcation of guiding principles required intelligent application on the part of the worker who found himself confronted with such diversity of soil and climatic conditions as prevailed in Natal. The A B C to the appreciation of the conditions responsible for the success or failure in the orchards of the world was a reasonable knowledge of the offices of heat and sunshine in fruit production. Ideal orchard conditions embraced (a) freedom from extreme low temperature, (b) abundant sunshine, and (c) an atmosphere devoid of excessive humidity during the fruiting season. The second and third of these conditions Natal did not possess during that particular period, and they were consequently confronted with the necessity for making the best of their surroundings by developing those fruits which already enjoy local conditions, and by the introduction of other varieties fitted by nature to withstand the influences adverse to the perfect development of many fruits in the moist atmosphere which was the inevitable attendant of summer in the Midlands and Coast belt of Natal. Altitude, in a measure, corrected these influences in the highlands of Natal, and favoured the almost perfect development of many of the choicer fruits of drier States and bracing climates. On temperature conditions, therefore, in the first instance, depended the success of the grower, for the reason that low temperature might debar success by total destruction, or by partial winter killing, and the fruition of many varieties of plants was precluded by insufficient or excessive mean temperature. Careful experiments, conducted by eminent viticultural experts, showed that a temperature above a certain minimum was found necessary for germination, a higher for chemical modification, a third for flowering, a fourth for ripening the seeds, a fifth for the elabora-

tion of the saccharine juices, and a sixth for the development of aroma. To meet these conditions Nature provided the genial conditions of spring, and advanced temperature by careful graduation until the demands of the ripening fruit were met by summer's high record. In support of this contention many of the table lands of South America, while enjoying the mean temperature necessary to the success of the grape vine, were wholly unsuited to its cultivation by reason of their constancy of temperature, which never rose to the higher degrees necessary for the proper development of the fruit. The vine might grow and even flourish, but the fruit was invariably lacking in quality, and often entirely failed to set in many of the leading varieties. To be successful the orchardist must have due regard to the following essentials: (1) A suitable climate, (2) suitable soil, (3) selections of varieties adopted to his soil and climatic conditions. The lecturer subsequently explained why many people at Durban and in the Coast belt could not succeed with the cultivation of such stone fruits as peaches and plums, and also apples, because they had not regard to the conditions he had mentioned; whereas 50 miles inland, without any material difference in the temperature, the drier atmosphere of the midlands encouraged many varieties of these fruits to produce to the extent of overbearing. Proceeding to deal with the cultivation of the soil for fruit-growing, the lecturer dealt with what is known in agriculture as "dry farming," illustrating on a blackboard how that by constant stirring of the soil in dry weather the capillary action of the surface soil was interrupted, and the subsoil moisture prevented from escaping. He had observed that on two plots of ground adjacent one that was subjected to constant surface cultivation in dry weather maintained its crops in vigorous growth, while the other on which no such cultivation was expended had its crops withering and wilted. He also enjoined subsoil cultivation, but explained that subsoil which were not favourable for the encouragement of plant life should not be brought to the surface; in other words that such subsoil should receive the disturbance which cultivation ensured, but it should still remain subsoil, the lower levels being torn up without being brought to the surface. The depth of surface cultivation to be effective should be determined by the character of the soil. In countries with a humid atmosphere and moist summer conditions a shallower cultivation would suffice than that adopted in the arid regions, say, of Western Australia, similarly heavy soils whose capillary attraction was much greater than that of loose loams would require to be more deeply stirred, owing to the difficulty of securing effective pulverisation. Apart from initial cultivation the orchard should be ploughed annually as deep as the plough can be safely run without destroying the main surface roots, in order to avoid "hard pan," or the setting of the ground near the surface, which would result if shallow cultivation alone were resorted to in the average heavy loams.

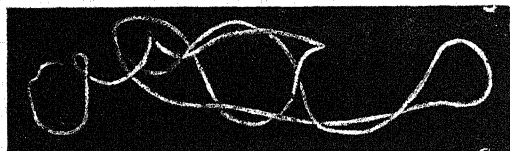
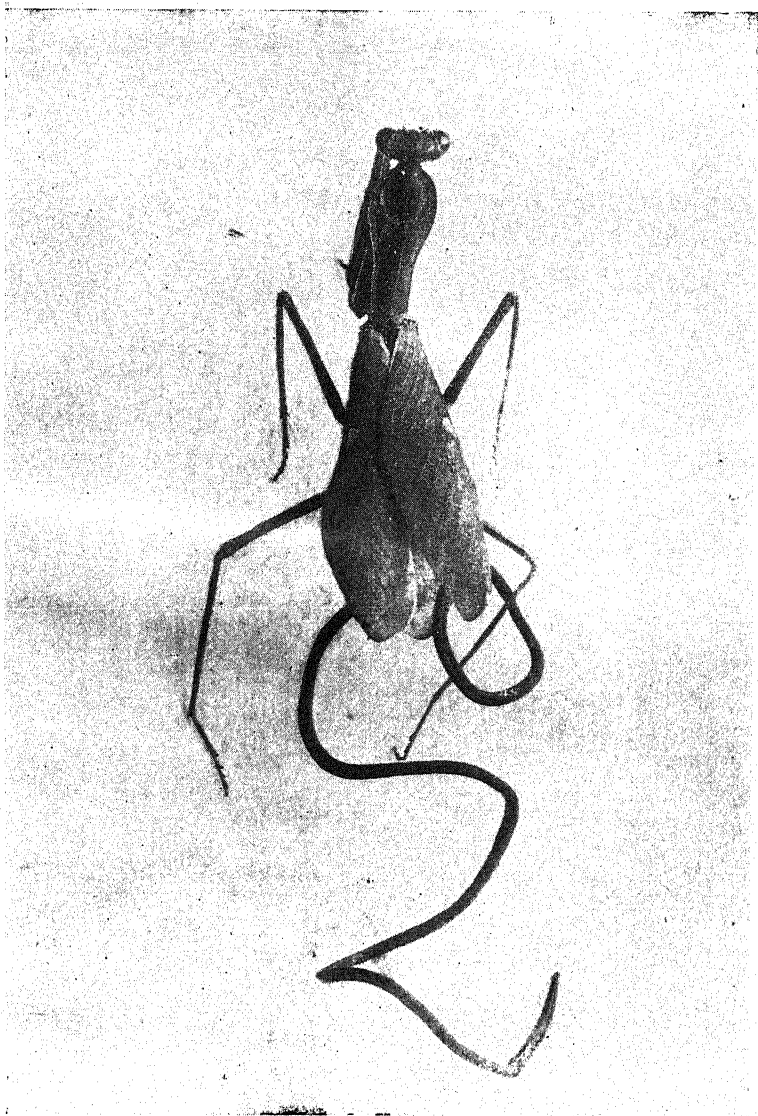
In loose loams or sandy soils such a procedure would not be incumbent. Draining, lining, and green manuring were important agencies. The first prevented the ground from becoming water-logged in wet weather, which condition was detrimental to roots; lining had the virtue of making heavy soils more friable, and yet had a binding effect on loose soils, besides correcting acidity and rendering the plant food more available. Regarding green manuring, this provided the valuable constituents of humus to the soil. This explained why coolie farmers succeeded in getting fine crops of mealies when they planted beans, peas, and other legumes between the mealie rows. Having dealt with chemical manuring, the lecturer proceeded to speak of the value of stable manure, but observed that in the case of rich ground it had a tendency to force the growth of the tree at the expense of yield and quality. In the case of orange, particularly the presence of excess of nitrogen possessed by kraal manure was productive of puffy and imperfect fruit. In manuring, local conditions, the character of the soil, and the kind of fruit to be raised had to be observed. Regarding the time for manuring, as a general rule, in the orchard, potash should be applied to heavy soils early in the season, whereas in light soils a later application was desirable. Nitrogenous manures should be applied early in the spring in the case of deciduous trees, and where practicable before they come into bloom. The question of what to plant in the orchard opened up a field without limitation. The endless varieties of the several species of fruit now available to man bore eloquent testimony to his progressive character and earnest endeavour, which must ever remain the keynote of better things. Following the inimitable laws of the survival of the fittest, they found in the world of horticulture that the favourites of fifty years ago were in the majority of instances the mediocrities or the obsolesces of to-day, and in pursuance of the same irrevocable law their present leaders were but the forerunners of that higher excellence which must in the near future mark the intelligent efforts of the scientific plant breeders of the present generation. Mr. Smith then proceeded: A few of the old favourites in the majority of our common species remain with us to proclaim the excellence of the age which heralded their advent. These must rank in the horticultural world as the brilliant debutantes of the past and the valued grandmothers of the present. They serve the useful purpose of reminding us that the struggle for improvement should not be permitted to sacrifice those virtues and qualities which constitute the heritage of an earlier age. Take, for instance, Fuller's description in 1864 of the American or Labrusca family of grapes. Of the 130 varieties described therein as worthy of a place in the American vineyards of the eastern States less than a dozen could win their position in the leading hundred which now claim the growers' attention; the remainder

are scattered throughout his latest list of 250 obsoletes. The same inexorable law of change and progress marks the history of the last few decades in the sister, or European, group, though not to such a pronounced degree. In plums we find more than a dozen families claiming the attention of Waugh, the great American pomologist, whose work embraces 750 varieties. These families, like those of the human race, have their pronounced preferences for climate. The domestic or European group pine for a temperate clime, while the Wayland, Americana Nigra, Wild Goose and Japanese groups, by means of the adaptability of their endless varieties, spread their bounteous offsprings over the vast area from New York to Southern Texas, and some of their hybrids are even partial to conditions which might fairly be regarded as sub-tropical. The same wide adaptability characterises the apple, the pear, and the peach, and though perhaps less pronounced, is more or less a feature of the various other species now ministering so generously to the needs of animal life. From the foregoing illustration, coupled with the remarks on the arbitrary demands of climate, it will be readily seen how utterly impracticable it would be for any one individual to arrogate to himself a knowledge which would even meet the varied requirements of our own little Colony. The apple-grower of Nottingham Road, Rosetta, or Greytown, with his choice of pippins and russets, would preach a ruinous gospel to the midlands orchardist, whom a lower altitude and warmer climate compels to seek solace in his ability to control a fairly representative collection of this useful fruit. Durban's magnificent facilities by sea and rail render her entirely independent of the necessity for cultivating apples, and a stray specimen of the varieties less partial to the cool and drier air of the highlands might be persuaded to set a few indifferent fruit in the coast belt under the most favourable conditions, but the experiment may safely be left to the enthusiast imbued with the desire to satisfy himself.

A few varieties worthy of a place in the home garden by careful cultivation, and the selection of a cool slope or otherwise sheltered site may give reasonable encouragement to the hobbyist in the neighbourhood of Malvern, and carry still better prospects in the region of Hill Crest. The most likely varieties are Rome Beauty, Wainwright, American Lady, Red Astrachan, and Jennings's Florida. A coastal selection of grapes should be limited to varieties of the Muscadine group, or the hardy Americans, whose robust constitution enables them to fairly successfully combat the attacks of fungoid trouble, favoured by coastal conditions. Of these families James and Thomas should represent the Muscadine, while the most promising of the Americans are Concord, Moore's Early, Diamond, and Niagara. Many of these are superior to the common Isabelle, erroneously referred to as the Calawba. Of the European

varieties little, if any, success may be counted upon near the sea level. The black Hamburg and the Raisin Blanc afford fair prospects on the Berea if provided with the shelter of a verandah having a northern or north-eastern aspect, particularly if fortified by frequent application of that powerful fungicide, Bordeaux Mixture. Pears may be dismissed as impossibilities, the successful cultivation of the European varieties being limited to the higher altitudes and cool valleys, while the sub-tropical varieties would probably fail even at Hill Crest. Plums may also be regarded as equally hopeless, although a few of the sub-tropical favourites, such as the Howe and Excelsior, may be persuaded to accept the conditions obtaining at an altitude of 1,200 or 1,500 feet. Of your own particular fruits, the orange, naartje, banana, pineapple, avocado pear, and mango, it is not inappropriate to remark that the Coast range in this connection is somewhat limited, and that other and probably better varieties await your call. In particular the mango affords an almost unlimited field for selection. In the orange group the wider inclusion of the Bahia, or Washington Navel, and Thompson's Improved Navel in your collections would undoubtedly tend to improvement. Concerning the peach it is my intention to confine myself to the Peento group, concerning which a useful future exists on the Coast belt, provided the selection is limited to varieties of merit such as the Helen, Suber, Florida Gem, Angel, Waldo, and Jewel. This group is so efficiently provided by Nature with the glandular leaves and other essentials of a hardy constitution that the several varieties are capable of withstanding sub-tropical, some even tropical, conditions to such an extent that the successful cultivation of the peach is now possible in the West Indies, the Angel, Jewel and Waldo in particular being relied upon for orchards of commercial importance. These varieties are vastly superior to the old red peach common in Durban gardens in the early eighties, and can be successfully cultivated in Durban. The fruit-fly is a deterrent to the cultivation of the peach in the Coast belt, but can be successfully combatted by means of netting. To ensure economical netting attention should be given to pruning, with the object of checking rampant growth and keeping the tree within reasonable limits. The cost of netting with bags, which can be made in a few minutes, is about 6s. per tree. The nets require to be put on five or six weeks before the ripening process. The cost of securing this immunity would be about 9d. per 100 fruit.

At the close of the lecture, after replying to a number of questions, the thanks of the meeting were cordially accorded to Mr. Smith, when he assured his audience that he would gladly reply to any further questions by post.



THE GORDIUS WORM AND THE HOTTENTOT GOD.

(See Article.)

The Gordius Worm and the Hottentot God.

By ALBERT KELLY, F.E.S.

Writing under date of the 16th April, a correspondent states:—

"I enclose herewith an intestinal worm 10 inches in length, which I have every reason to suppose is exuded from the abdomen of the large green Mantid. I have within the last fortnight detected them squirming about on three separate occasions, each time in close proximity to a fowl busily engaged in pulling Mantids to pieces."

My reply thereto may be of some interest, as the worm referred to is often sent to this office with a request for information regarding it, and very often the specimen submitted is one that has been taken from a locust. Some years ago one of our local newspapers created some consternation by an announcement that a snake had come through a water tap into a bath which was being filled, but "the snake" referred to ultimately proved to be a worm similar to the one sent:—

"The specimen accompanying your letter of the 16th instant proves to be a Gordius worm, all of which are parasitic in their habits. They are frequently to be found in ditches, ponds, or large puddles, and sometimes a considerable number may be found inextricably tangled together in a knot, and the name of the genus refers to this fact.

"The worm passes through four distinct stages, the egg, the first and second larval stages which are parasitic, and the fourth stage or that of the sexually mature worm, which lives in the water, takes no nourishment, and is, in fact, exclusively engaged in the reproduction of its kind.

"The best worked out form is, perhaps, *G. tolosanus*, and a short description of its life history may be of interest to you.

"The adult female may be observed twisting round the stems of water plants, to which the long bead-like strands of eggs are attached. On hatching, the larva sinks to the bottom of the water, where it moves about sluggishly and awaits the arrival of the right host in which to take up its abode. In this particular case it happens to be the larva of the Alder fly, and into this it bores its way and comes to rest in the muscles or the fat body. Here it remains during the following winter and in the spring passes over to the adult Alder fly. This insect frequents the small plants growing along the water's edge of streams, where it falls an easy prey to the predaceous beetle *Pterostechus niger*, normally feeding on land snails, but just at this season often driven to look for water snails owing to the scarcity of the terrestrial form. The larva contained within the body of the adult Alder fly has now gained an entrance into

the body of the beetle, which, incredible as it may seem, is absolutely necessary for its further development. It here assumes the second larval form and remains in the body of the beetle for the second winter, finally to return to the water as an adult some eighteen or twenty months after its hatching from the egg.

"It is thus seen that it is only because of the enormous number of eggs laid that the worm is able to perpetuate itself, as the chances of an egg coming to maturity are infinitesimally small. In addition to the risk of the larva not finding the right host at the right time, and of the first host not being eaten by the second, and the second not gaining access to the water, there is the danger that the ditches and ponds in which the adults live may dry up, which, indeed, is of frequent occurrence.

"The life of a Gordius is, indeed, a perilous one, and the complicated nature of its life history is extremely difficult to appreciate."

Eggs being saved for hatching should be kept at a temperature not lower than 45 nor higher than 75 degrees.

Extra heavy layers as pullets and yearling hens are not so valuable in their second year as steady layers.

Push the little fellows along. If they don't like what you are giving them, don't try to starve them into eating it, but change their diet.

Keep the best pasture for the lambs. Clover is good, so is a fresh blue grass pasture, but an old one is productive of worms and possibly death.

Feed the pigs so they will be contented. By giving them too much the feed is wasted. If fed too little they become restless and try to break out.

Royal Agricultural Society.

FIFTY-FOURTH ANNUAL SHOW.

A SUCCESSFUL EXHIBITION.

THE Royal Agricultural Society of Natal held their fifty-fourth Annual Show on Thursday, Friday, and Saturday, the 17th, 18th, and 19th June, in the Society's grounds in Maritzburg.

So far as the number of entries is concerned the show was a great success, the total constituting almost a record figure, but some of the sections were not up to the standard of last year. This remark applies particularly to the Industrial Section, which was rather disappointing after the high standard set by previous shows held by the Society. The horse sections were a great advance on previous exhibitions, and some fine animals were shown. The sheep sections showed up well in the Merino and Shropshire classes, and some fine Long Wool animals were exhibited. The goat section was a relatively small one; but a feature of this section was the milch goat class. There were only a few entries in this class, but they were fine animals. Some fine animals were shown in the pig section. The poultry section—in reality the annual show of the Natal Poultry Club—was one of the great features of the show, and attracted much attention; the show was a comprehensive one, and contained many remarkably fine birds. Farm produce was as good as ever; and an interesting stand in this section was that of the Government Experiment Farms. Here all classes of produce were shown from all the farms. The machinery section was well up to the standard of former years, and some interesting exhibits were on view, which, with the other sections, we notice more fully further on in this report.

JUDGES AND STEWARDS.

The following is a list of the judges and stewards, omitting those officiating at the sports:—

Horses, Mules and Donkeys.

Thoroughbred Horses.—Judge, W. Henwood; stewards, J. Blackburn and B. Baikie.

Cart Horses.—Judge, Wm. T. Woods; stewards, A. C. Smith and W. L. Stead.

Carriage Horses.—Judge, S. T. Amos; stewards, V. Palframan and C. B. Butler.

Saddle Horses.—Judge, P. D. Simmons; stewards, C. J. King and F. A. E. Greene.

Mules and Donkeys.—Judge, J. B. Palmer; steward, W. Westwood.

Sheep.

Merino Sheep.—Judge, H. D. Winter; stewards, T. R. Atkinson and N. J. Hayes.

Shropshire Sheep.—Judge, H. Pennefather; stewards, A. H. Burman and W. F. Taylor.

Long Wool Sheep.—Judge, Jas. Henwood; steward, C. Havemann.

Crossbred Sheep.—Judges, Combined Down Judges; stewards, Combined Down Stewards.

Persian Sheep.—Judge, A. Reid; steward, C. J. Moor.

Fat Sheep.—Judge, Frank Knapp; steward, C. J. Moor.

Goats and Pigs.

Goats.—Judge, H. D. Winter; steward, Reg. Campbell.

Pigs.—Judge, A. Reid; steward, J. C. Walker.

Dogs.

Dogs: Sporting and Large.—Judge, G. Gibbon; steward, J. A. Gibbon.

Dogs: Terrier and other Dogs.—Judge, H. H. Jones Ikin; steward, F. W. Merryweather.

Dogs: Litter and Best Dog.—Combined Judges.

Vehicles.

Carriages.—Judge, W. Pope; steward, F. Collier.

Wagons and Carts.—Judge, Dan Taylor, M.L.A.; steward, W. E. Goodwin.

Farm Produce.

Mealies.—Judge, J. Marwick; stewards, S. Moon and P. A. Robinson.

Grain, other than Mealies and Fodder.—Judge, J. Moon; stewards, T. H. Chaplin and H. A. Meyer.

Wattle Bark.—Judge, T. Gibson; steward, C. W. Holdgate.

Roots and Vegetables.—Judge, H. Baker; stewards, F. S. Robinson and J. Baker.

Fruit.—Judge, F. Stevens; steward, C. W. Holdgate.

Dairy and Food Classes.

Dairy Produce.—Judge, A. Lawrence; steward, — Balding.

Working Dairy.—Judge, A. Oliver.

Food Classes, 174-181 and 190-197.—Judge, W. Merrick; steward, P. W. Merrick.

Food Classes, 182-189 and 198.—Judge, J. L. Baumann; steward, N. Y. Griffin.

Tea, Sugar, etc. also Classes 249-253.—Judge, J. F. Greaves; steward, H. W. Griffin.

Implements and Machinery.

Implements.—Judges, W. Pepworth and W. B. Turner; stewards, R. Comins and W. E. Goodwin.

Engines.—Judge, W. J. Quince; steward, W. E. Goodwin.

Miscellaneous.

Tobacco and Cigars.—Judge, E. R. Sawyer; steward, H. A. Meyer.

Apiarian.—Judge, R. H. Pepworth; steward, B. Campbell.

Millers' Manufactures.—Judge, T. Burman; steward, A. Herbert.

Fibre and Flax.—Judge, T. R. Sim; steward, A. Herbert.

Harness and Saddlery.—Judge, A. A. Gibson; steward, A. Herbert.

Fretwork.—Judge, D. Baillie; steward, A. van Aardt.

Stall Display, etc.—Judges, W. Merrick, J. Holey and F. Reed; steward, A. Herbert.

Colonial Industries.—Judges, Jas. King, Rev. J. Scott and Thos. Hyslop; steward, H. W. Griffin.

THE OPENING.

The Show was formally opened by His Excellency the Governor at 12 o'clock on Thursday.

Mr. James King, the President of the Royal Agricultural Society, in introducing His Excellency, said the present Show was almost a record in the matter of entries. He alluded to the ravages of East Coast Fever, which he characterised as one of the great drawbacks they had in Natal as a recurring disease, and there did not appear to be any immediate prospect of the disease being removed. Cattle had always been the main feature of their Show. But there was a vast resource behind them in the energy and perseverance of the Natal farmers, which he was quite sure would pull them through. He mentioned that in the produce section this year there were 211 entries as against 114 last year; 905 in the poultry section as against 127 last year, and 64 entries as against 18 in the machinery department; sheep 108 as against 73. The total entries were 2,084 as against 1,012 last year. (Applause.) Mr. King thanked the Mayor and the Town Council for the interest and help they had always shown in the work of the Society.

His Excellency then addressed the gathering as follows:—

“Ladies and Gentlemen,—The occasion of our Annual Show has again come round and again we permanent residents of Pietermaritzburg extend a hearty welcome to the farmers that have come to their headquarters, bringing with them the best of their produce with which to compete among themselves and give pleasure to non-competitors by showing what can be bred and grown in our country. And once again I have to express my own pleasure in opening a Show of which to my mind the great merit is that, like the many kindred exhibitions held throughout the Colony, it is a stimulus to production. We want this stimulus. It

is recognised that Natal does not produce up to its full capacity either for home consumption or for exportation.

"Last year articles of food and drink and tobacco to the value of over a million sterling which could have been produced in this Colony were imported for consumption in it from overseas. This million was made up of over £350,000 for dairy produce, that is milk, butter and cheese; of nearly £300,000 for agricultural and garden produce including tea and sugar; of an approximately similar amount for general farm produce: beef, mutton, poultry, bacon, jams and eggs, the number of eggs imported being over a million and a half; and of over £100,000 worth of tobacco. So far this year Natal has not imported quite so great a proportion of her own food, but for the first three months this importation has exceeded £200,000 sterling, about a third of this amount being for dairy, a quarter for agricultural and garden, and a quarter for ordinary farm produce, the remaining sixth being for tobacco. Bear in mind that these figures—a total of over a million sterling for 1908 and of over £200,000 for the first three months of 1909—refer only to produce consumed in Natal that might have been grown there but was imported. The produce imported into the whole of South Africa that might have been grown in Natal is of course several times as great.

"It is rather flogging a dead horse to urge the undesirability of this state of things. Various factors are fortunately contributing to alter it. Customs dues and railway rates are being used to assist competition with imported articles. The organisation known as the National Union of South Africa, of which the energetic Sir Pieter Bam is Chairman, and our equally energetic Minister of Agriculture, Mr. Deane, is Vice-President, is doing its best to encourage local consumption of South African products and to find overseas markets for them. Again various organisations are assisting farmers by working up their raw materials into forms which readily find a market. The last organisation of this nature that has been started in Natal and one which I recommend those who do not know it to visit, is the Bacon Factory at Nel's Rust. Through its agency any farmer who chooses to acquire a few pigs of good breed and feed the increase with the butter-milk from his cream which would otherwise be wasted, can be certain of getting a constant and good price for animals he may send to the factory. The possibilities of this industry will be realised when it is considered that in Denmark—a country less than half the size of Natal—it has been worked up within twenty years to an annual value, as represented by slaughtered animals, of three and a half millions sterling.

"In addition to the other agencies I have mentioned as tending to increase the proportion of the food consumed in Natal that is produced there, is the important one of agricultural shows. The functions of these is to raise the standard of produce. You cannot expect people to

consume locally-produced food if it is inferior in quality to that which is imported. The point is too obvious to justify me in labouring it. In agricultural, as in every other branch of industry, a high standard results in a wide demand.

"I congratulate the Royal Agricultural Society on there being more entries this year than on any previous occasion, in spite of the East Coast Fever still keeping cattle away, and the Natal Poultry Club on the large number of birds shown in their 179 classes. I declare the 54th Annual Show of the Royal Agricultural Society, and the 23rd of the Natal Poultry Club to be open."

SOME NOTES ON THE EXHIBITS.

We are unable to publish in the present issue any of the photos which our representatives took at the Show, but a selection will appear in our next issue together with some photos which we hope to take at the Durban Show next month.

A number of our photos are pictures of 1st-prize winners in the Horse Section—a section which has, perhaps, rarely been surpassed in former Maritzburg Shows. In our opinion this and the Poultry Sections were about the finest in the whole of the Show. Considerations of space preclude our making any reference whatever to individual exhibits, and we are unable for the same reason to publish a prize-list. Interesting classes were those for mules and donkeys in pairs and in spans; and we hope in our next issue to be able to publish some illustrations of the mule transport turnouts. There were some good animals shown in the Sheep Section, the Merino and Shropshire Downs containing some attractive exhibits, whilst we noticed some good animals among the Long-Wools. The goat classes were not as full as they might have been considering the importance of our mohair industry. Of some interest were the exhibits of milk-goats, which were brought forward in response to the special prizes offered by Messrs. J. W. B. Kean and H. P. Handley. It was to be regretted, however, that more exhibits were not forthcoming in this special section, the four animals exhibited all being shown by Mr. and Mrs. J. P. K. Ford, of Maritzburg.

In spite of the fact that the number of exhibits in the Pig Section was somewhat limited, it cannot be denied that some of the animals were equal, if not superior, to most of those which have been previously shown in Maritzburg. The Salvation Army Social Farm, South Coast Junction, was the most prominent in so far as the carrying off of prizes was concerned.

The Produce Section was good, there being some fine exhibits of mealies, mangolds, swedes, forage of various kinds, sugar cane—to mention a few of the chief. The Division of Agriculture and Forestry of the Department of Agriculture had a fine exhibit of produce of all kinds

grown on the Government Farms. We have seen better exhibits of fruit at the "Royal" Shows, though there were some fine individual specimens shown.

Dairy Produce showed up as well as in former years; some classes, in fact, we thought, were considerably better. The Nel's Rust Bacon Factory and the Mooi River Factory had fine exhibits of hams, bacon, lard, sausages, and preserved meats, the excellence of which must have opened the eyes of many of the visitors to the Show.

Space does not allow of our commenting upon all of the various interesting stalls in the Industrial Section—many of which had fine exhibits, but we must remark upon the interesting stand of the Umbilo Manufacturing Co., of Durban, who showed among other things a number of sweet potato products, such as flour, starch gloss tablets, ice cream powder, sago, etc. We were also particularly interested in the stand of the Clan Syndicate, where, together with a good show of wattle wood boxes, a quantity of wattle wood charcoal was exhibited. The Industrial Section was very interesting, but we do not think that, taking it as a whole, it was up to last year's standard.

The Machinery Section of the Show was as interesting as ever, and most of the usual firms had their stands. The wattle bark exhibits might have been more representative, but we noticed a useful machine designed by Mr. Arthur Wood, the well-known engineer, of Maritzburg, for bark chopping on large plantations where the work is continuous and heavy. The machine, which is of massive construction, is built on the chaff-cutter principle with heavy toothed rollers to draw the bark from the feedway and present it in a flattened condition to knives rotating on a large wheel. In this connection we noticed several large chaff-cutters strong enough to cut bark which will doubtless more and more find a place on the smaller plantations. Messrs. Parker, Wood & Co., Steel, Murray & Co., Malcomess & Co., and J. Henwood, Son, Soutter and Co. showed a large variety of ploughs, planters, harrows, harvesters, mealie-shellors, mealie-mills, and dairy appliances. Messrs. P. Henwood, Son, Soutter & Co. showed a particularly rapid mealie-sheller, the "Climax," which appears to be one of the latest and most up-to-date shellers in the market. This machine took 1st prize at the 1909 Johannesburg Show, and also 1st prize at the last Durban Show. It is worked by hand and shells very rapidly and cleanly, rarely missing. Among the special features of the Show mention should be made of the two cattle dips which were on view in working order. One of these was the Natal Spray Pen, invented by Mr. H. Watkins-Pitchford, extended reference to which has already appeared in the *Journal*. Its erection at the Show gave farmers an excellent opportunity of examining the dip and noting for themselves the principle of the invention and plan upon which it is constructed. The second dip is Quibell's Cattle Washer, a new patented invention sub-

mitted by the local manager for the well-known firm of Quibell Bros., Ltd., Newark, England. The principle on which it works is obvious at first sight. The apparatus consists of a shallow walk-in tank about 3 feet 6 inches deep, with the usual entrance rails and draining pen. Beside the tank stands a platform 12 feet high, and mounted on this is an ordinary hand pump having its suction pipe connected to the bottom of the dipping tank, while its delivery flows through a strainer into a barrel placed in front. The latter is fitted with a long, flexible hose-pipe and nozzle, while below the platform stands an ordinary standard 400-gallon iron tank for storage purposes.

The idea—which is patented—is that the animal stands with the whole of its under parts immersed in the dip, while the Kafir working the pump above circulates the dip through the hose, which is manipulated by another man, who, working from behind and against the hair, thoroughly wets and washes the animal down in a surprisingly short space of time. When the herd is dipped the nozzle is turned into the storage tank and the whole of the dip passes back through the strainer, and the lid being replaced there is neither evaporation nor dilution by rain water to be feared. The whole apparatus can be erected by any intelligent farmer with materials on the premises, and the total cost if all the iron work has to be purchased does not exceed £15 to £20 at the outside. The royalty fees demanded by the patentees are very low, and, indeed, to old customers of Messrs. Quibells are absolutely free. Plans, descriptive directions and registration certificates can be obtained from the firm's Durban agents, Messrs. A. J. Keiler & Co., Point, or W. H. Griffin & Sons, of Maritzburg.

An interesting feature on Messrs. Parker, Wood & Co.'s stand was a large exhibit of Holmes' Cattle Dip, which consisted of a large archway built up of cases of the dip.

The Natal Poultry Club held their show in conjunction with that of the Royal Agricultural Society, forming a large and very attractive feature. It was unfortunate that more space was not devoted to this section, as the number of visitors was large and the birds were not always seen to the best advantage. All the classes were good, and some excellent birds were shown.

The Show lasted three days with sports in the afternoons, and was as well patronised by the public as ever.

When buying cows be careful about what you get. If the seller tests his herd be doubly careful.

South African Fruit Export.

VIEWS OF AN ENGLISH EXPERT.

IN its issue of the 15th May, the *African World* publishes an interesting interview with Mr. T. J. Poupart, of Covent Garden, London, who handles large quantities of South African fruits in the course of his business and who is an authority on all questions relating to the marketing of fruit in London. We take the liberty of reproducing herewith the principal portions of the "interview," which we think will be read with interest by all persons concerned in the export of South African fruit to England.

In reply to a query as to the most prominent features of the South African fruit export trade, Mr. T. J. Poupart said:—

"These you may describe as having been, in the past, pears, plums, peaches, apricots, nectarines, and grapes, the last-named having arrived in considerable quantities. But lately naartjes, especially some excellent specimens from Natal, have become, and will be more so, a prominent feature of the trade. Good naartjes come also from the Cape later on in the season. Oranges from the Cape, Transvaal, and Natal attracted much attention. Last year the Cape and the Transvaal were the largest shippers of the three Colonies, but we are given to understand—and we sincerely trust—that the exports of Natal this season will be considerably increased."

"Which Colony sends the best oranges?" the *African World* man next asked.

"It is hard to say. In good condition there is not much to choose. The South African orange is greatly liked. Last year those from the Transvaal and Natal were carefully selected and well packed—a most important feature, and one which cannot be over-estimated. No doubt Cape growers will appreciate this in future. Up to the present the packing of Cape oranges leaves much to be desired, but it is only fair to add that some experimental lots from the Cape last season were very good, the seedless or navel oranges in particular."

Questioned as to what in the whole survey of marketable South African fruits were the best and easiest of disposal, Mr. Poupart without hesitation said that citrus fruits must be given pride of place. The point was thus amplified:—

"Citrus fruits provide the best prospects for commercial enterprise. They arrive here when oranges are scarce—in fact, there is practically nothing to compete against South African oranges and naartjes. Although not the time of year when there is the strongest demand for that

class of fruit, a fair trade there will always be, especially when the public become accustomed to the presence of oranges in the height of summer. Then, again, we do a good business in the re-export of these fruits to the Continent, principally to Germany. This necessitates re-packing, as, owing to the duty charged for the entrance of foreign fruit into Germany, absolute soundness is an essential feature to the German buyer."

PACKING.

"Tell me how you view the present-day packing of South African shippers."

"There is now very little wrong with the packing of those whom we may term standard growers, but there are Cape shippers who have developed a habit of marking their boxes with an unnecessary number of descriptions, such as selected, extra-selected, etc. This is quite superfluous, as under modern conditions the 'count' or number of fruits in a box is sufficient indication of the grade. Specially commendable was the packing of last year's Natal naartjes, and these will assuredly meet with a good demand this season. The fruit was well graded, and packed in a style which appealed to the eye—a most important factor in catering for English trade. Loose-jacket naartjes not being so good or juicy as the close-skinned variety, it is advisable to focus on the latter for our market. The standards of selecting and packing adopted by the Natal Government and carried out under the supervision of their expert are to be highly commended. It would be well to keep closely to these, as buyers on this side insist on having the best. Careless or slipshod methods are worse than useless—they are harmful.

AUCTION *vs.* PRIVATE SALE.

"That the salesman should be assisted in every possible way is obvious, and in this respect promptitude and completeness in the matter of advices is essential. Large shippers should endeavour wherever possible to advise their selling agents a mail in advance of what they are likely to be shipping. It is unwise to leave a salesman in doubt as to whether he is to expect large, small, or perhaps no consignments. Regularity of supplies is of great importance. A steady supply creates an equally steady demand. Spasmodic shipments injure the trade."

On this subject Mr. Poupart made some forcible and pointed remarks.

"There have been some irregularities in regard to quality. Cape pines, for instance, have been only poor stuff this year. Some, indeed, were of such inferior quality that they should not have been shipped."

"Calculated to unfavourably prejudice the market?"

"Precisely. Quantity large, size and quality poor.

"We are emphatically of opinion that to ensure goods being sold absolutely on their merits private treaty is preferable to auction. That is

specially applicable to the sale of good fruit—for inferior quality the auction is the place. Auction patrons are frequently speculators who will not buy except at a low price, on the off-chance of effecting a resale. Private treaty buyers are usually in want of the goods. Besides, the auction takes place at a fixed hour only, whereas the private salesman's establishment is open to purchasers during all the hours of business.

INCREASE OF SHIPMENTS.

"It is not advisable whilst the oversea export trade of South Africa is still in its infancy to swamp the market with excessive supplies at any one time; the increase must be gradual. Eventually we shall be able to handle much larger quantities, but the public must be won over by degrees. South African fruit has yet to be further popularised. But we have every confidence in the future and prospects of South African fruit."

Continuing, Mr. T. J. Poupart said:—

"In the 1907-8 season Cape apricots swamped the markets. Many had to be thrown away. In 1908-9 there have been comparatively few, and they realised good prices. Melons have not arrived satisfactorily, and the probabilities are not indicative of a great future for them, if only for the reason that the time of the year at which they arrive is not propitious for their disposal. We could get rid of, perhaps, not more than 100 to 200 cases a week.

"The most popular grapes from the Cape are the red and white Hanepoot, the Hermitage, and the Raisin Blanc. Stewing pears do not pay to ship. Quinces, too, are useless. But for pomegranates the prospects are excellent, especially if sent here to be retailed at 2d. to 3d. apiece. For Avocado pears there is but a small future if sent sound, yet there will always be a market for a small quantity of these.

PINEAPPLES.

"For pineapples there is a great future on this market if well selected. Natal has sent the better type. It is advisable in shipping these or any other fruit to consign to one centre only, such as London, as here we have both the English and the Continental demand at our call. Equally advisable is it for the oversea grower to look out for a good, reliable salesman and ship direct to him. Otherwise, as some shippers have already discovered, they are really creating competition against themselves, if not actually playing into the hands of the parasites who adhere to the fruit industry as to every other great trade."

Keep plenty of clean water within reach of your hogs at all times.

Farm and Garden Notes for July.

By GEO. CARTER, F.R.H.S.

ONE of the most interesting points about *Paspalum dilatatum* is its self-sowing nature. Wherever it has once got a hold, in all sorts of ground, and in all manner of conditions, and without any further help from man, it gradually and surely increases in area, crowding out all its weaker opponents without mercy by sheer vigour. Around Maritzburg, I estimate there are not less than 100 acres now covered with this grass, the first stray seeds of which arrived in some fodder from Australia during the earlier part of the late war, immediately obtaining a foothold in the roadside. From there the seed was spread downwards in all directions until all our vleis are gradually being filled with this most excellent weed.

During a recent visit to Mooi River district I saw just the same process in operation. Wherever the seed has been sown on fairly high ground, and ground well, one could trace from that point long trails of seedlings down the slope of the ground towards the vleis, forming generally a well-compact turf, in most cases relished very much by sheep, and tailing off gradually in the number of plants as the distance from the original patch increased. All this is very interesting and instructive. The method of distribution might be to some extent by winds, but the clear evidence of water carriage (distribution by means of storm wash) cannot be ignored. Nor can another point—that where the storm water carries the seeds it also generously covers them to just the right depth for growing well. All seeds which drop naturally are of perfect germination, hence the three conditions of growth are completely fulfilled by Dame Nature herself—fertile seed, water, and covering to the right depth.

Now herein lies a very obvious lesson for those who desire to increase the area of *Paspalum* grass on their farms, a lesson in economy by which Nature herself may be harnessed for the improvement of our natural veld. Only, the farmer must provide the harness, and inspan. The right procedure, I think, is to plough areas on the higher lands of the farm, say areas surrounding vleis, and to sow this with choice seed at 10 lbs. to the acre. This gives Nature her start, and when the grass seeds in the second year, the heavy rains (the storm wash) will gradually work the seed down to the lower levels, covering and ensuring germination and growth at the same time. The process will be very sure, and quite large portions will be thus improved every year. As there is likely to be a great deal of *Paspalum* put in during the coming season this lesson from Nature is worth bearing in mind.

the same ground, without division and fresh food, good flowering is impossible, and to do the work early gives the plants time to make plenty of fresh root before the flowering season comes round.

Pruning of roses should be completed by the end of the month. Annual Asters for October flowering may be sown in boxes, and transplanted next month. All the hardy annuals may now be sown in the midlands, but where August is still a cold month it is better to wait a month longer unless a small hot bed is available.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

THAT the succeeding progeny of the female previously impregnated does in some instances possess resemblances to the male, by which she was thus impregnated, cannot be gainsaid. . . . Enough has been gleaned from observations and otherwise to make it clear to the breeder of high-class stock that to breed thus is always attended with an element of hazard, since it may introduce into the progeny variations that are not desirable.—*Prof. Thomas Shaw ("Animal Breeding.")*

SOILS FOR IRRIGATION.

Loamy and humus soils are the most suitable for irrigation. If the soil is an open, porous sand, the liquid then percolates down too rapidly and reaches the drains before it has time to purify, and the brown juice may reach the ditches just as much as if it were turned in direct. On the other hand, a clay does not allow of sufficient percolation, and the water is liable to flood the surface. With a medium soil, however, there is the proper combination of porosity and retentiveness for the work, but unfortunately we have generally to take the soils as we find them.—*Primrose McConnell, B.Sc. ("Soils: Their Nature and Management.")*

SOAPY MILK.

Weigmann has studied a special alteration of milk which makes it "soapy." Milk which at first appears normal acquires a disagreeable taste of soap within 24 hours. Weigmann has discovered that the cause of this change is a special bacillus, which sown in milk gives it the same

soapy taste. He also found this microbe in the straw used as litter, from which it appears that the milk is infected when the litter is changed at milking time. It is, therefore, recommended not to feed straw to cows, nor change their litter, at the time of milking.—*Dr. Ed. Von Freudenreich ("Dairy Bacteriology.")*

SOILS FOR CITRUS TREES.

Citrus trees succeed best on well-drained soils of a rather open nature. If naturally well drained, so much the better, but if not, drainage must be provided. No stagnant water should stand in the grove. neither should the soil be completely charged with water. Soils of an extremely open, porous nature are unsuitable, as they do not hold sufficient moisture, and if they are deficient in plant food and recourse has to be made to commercial fertilisers to make up the lack of fertility, these leach readily from the soil, and the full effects from their use cannot be obtained. If the surface is good, tillable earth, with a fair admixture of sand, so as to open up, and the subsoil is somewhat closer so as to hold moisture and prevent leaching, the ideal conditions have been secured.—*Prof. H. Hume ("Citrus Fruits and their Culture.")*

APPLYING FERTILISERS.

Fertilisers usually give best results when they are well mixed with the soil which lies near to and around the seeds when they are planted. Liberal applications of high-grade fertilisers, especially if applied when the soil is dryish, may do serious injury by absorbing the moisture in the soil, thereby arresting germination, or by furnishing plant-food which is too concentrated for the young rootlets, in which case the roots are injured, and are said to be "burned off." When moisture is abundant, no damage is likely to occur since the fertilisers then tend to become diffused through the soil, but it is not only safest, but most economical, to incorporate the fertiliser with some of the soil in the drill or row. The quantity to be applied can be determined only by trial, having in mind that a residue always remains unused by the crop to which it is applied, in which case it may be of some value to succeeding crops.—*Prof. I. P. Roberts ("The Fertility of the Land")*.

A sick chicken is one of the most useless and most disgusting things on earth to the poultryman. Don't let them get sick.

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

Points of a Good Sow.

SOME very useful hints are published in a recent issue of the *Journal of Agriculture*, Western Australia, under the heading: *What to look for in a Brood Sow*. It is not such a difficult matter as might be expected to go into a piggery with a large number of the usual cross-bred and mongrel sows, and pick out the sows which produce the best litters. Milk production and general maternal capacity are associated with certain characteristics in pigs as in dairy cattle, and a little study of type in pigs will enable anyone to pick out the most profitable sows to use for breeding purposes.

Before indicating what to look for it might be as well to state that there should be no second look at the pretty little sow. She is a charming picturesque animal, round and beefy, small points, and fine bone, just the sort of pig to make a butcher glad, and such is her best destination. In the breeding pen her litters will be small, her milk secretion will be light, and her progeny will not develop with the intensity of vigour which is the best thing to drive pigs to a profitable death. The refined Berkshire is a good illustration of this type, and should be avoided in the breeding pens.

It will be found that in most instances the sow which is the very antithesis of this is the best parent. Her body is long, deep, and comparatively narrow. It should be remembered that the digestive organs of the brood sow play, perhaps, the most important part in her career. They are called upon to do more work at certain times than the digestive organs of any other animal, and the success of her litters is largely determined by the amount of food which they can make ready for conversion into milk. Hence it is, that length and depth in the body are exceedingly important features in a sow for breeding purposes. The next thing to look for is a well-formed udder, free from badly-developed patches or calloused parts. The phlegmatic sleepy sow is to be avoided. Good mothers are generally somewhat nervous, like dairy cows. Milk secretion has been proved to be largely a nervous function, and the dull, somnolent cow is seldom a mother of high order. A good backline is a useful point. Hollowed backs are not safe; they should at least be level, and, if slightly arched, so much the better.

Many, when choosing sows, avoid those coarse in their points, but this is a mistake, for the type of sow referred to is generally somewhat coarse about the head and long about the legs. The latter point is a good one, for, unless such a sow had longish legs, it would be found that as she approached farrowing time her udder would become chafed and sore from contact with the ground. The best brood sows will generally be found to be "clean" in the joint and shoulder, their head, neck, and shoulder suggesting those of the Jersey cow. It is thus seen that the sows recommended for breeding purposes are not the least like the animal which they are required to produce for the butcher; indeed, they may be said to be the opposite type. Consequently, the boar should be a good specimen of the meaty type, like the Berkshire. It will be found that the offspring take after the sire largely in external form, and the vigour, constitutional strength, and digestive capacity of the mother will be inherited to the resultant benefit of the breeder.

Overhead Ropeways.

The *Tropical Life* in its issue of April, 1909, suggests the use of overhead ropeways for the carriage of produce, such as tea, fruit, etc., on large plantations and estates in the Tropics, and interesting illustrations are given of such ropeways in use in Jamaica and Ceylon. One of the ropeways shown has been constructed to carry 1,000 bunches of bananas per ten hours. The bunches do not exceed 120 lb. each, the average weight working out about 90 lb. The length of line illustrated is a little under a mile, and there are several very steep gradients to be negotiated; so there are with the line conveying tea in Ceylon, of which an illustration is also shown. The system by which such lines are worked, however, is capable of overcoming all the trouble connected with gradients, etc.

An endless running rope is carried upon supports at intervals, to which carriers are rigidly attached and consequently move with the rope. These carriers are generally made in the form of a cradle and secured by a catch, on release of which they overturn and discharge their contents into a suitable receptacle at the discharging point. The loading and unloading of the carriers can be done whilst the line is in motion. The Jamaica line runs at a speed of about two miles an hour, and is driven by a 3-h.p. oil engine. The whole of the plant and material was designed and supplied from this side, and was erected entirely by native labour in Jamaica without any difficulty. The trestles and frames are of timber, and the endless rope was sent out spliced to the exact length required. The rope is only $\frac{3}{4}$ in. in diameter, and an apparatus is provided for tightening it when necessary.

This consists of a long screw and a powerful steel spring in compression, forming what is known as a live tension. The line illustrated has been at work for about four years, and has given complete satisfaction. From all accounts this type of ropeway is the most economical that can be constructed, both as regards its first cost and the expenses of working, and should prove of great use to many banana, fibre, tea, and other estates where produce has to be transported independently of rail or waterways. The overhead ropeway system would probably be found of considerable use in Natal, and could probably be obtained with specially-constructed carriers for the transport of cane.

Maize Culture.

Some useful points on the culture of maize are contained in the May issue of the *Queensland Agricultural Journal*. The essential thing in the cultivation of maize is to keep the soil free from weeds, and covered with a soft soil mulch. There are some who advocate deep cultivation, but the results of fifty-six tests at seventeen Agricultural Experiment Stations in America have shown, an average increase of 42 per cent. resulting from shallow cultivation as compared with deep cultivation. It has long since been determined that cultivation conserves soil moisture, and makes the ground warmer. At the Wisconsin Station cultivation 3in. deep left the ground more moist below the cultivated layer than cultivation 1½in deep. If the methods of maize cultivation are based on the root development, it would seem that level cultivation 2in to 3in. deep is most logical.

To Fatten Young Fowls.

The quickest method of fattening fowls for the table, according to *Garden and Field*, is to put them into special coops and feed them with meal. Premising that they be young—say, 16 to 18, or even 20, weeks old—and fleshy, two weeks' confinement ought to make them very good. The birds must have room in the coop to stand up and shift their positions, but not to move about. They should be fed three times regularly every day, and their food should be soft meal, as it is almost impossible to get fowls in proper form on hard mealies. Pollard, barley meal, mealie meal, or rolled and ground oats, mixed with a little rice flour and skim milk, and occasionally dripping or suet, is good food. The feeding troughs, which must be kept constantly scoured, should be placed before the birds at regular intervals, the first being directly at daybreak; and when they have eaten sufficient it is best to remove the troughs, placing a little gravel within reach of the fowls to assist digestion. The food should be freshly mixed each day, and no more given than will be eaten clean at each meal.

Keeping the fowls without food for some hours after they are put up frequently induces them to take it more readily afterwards; but sufficient attention is rarely bestowed on the various details of preparing and supplying food, hence complaints of the fowls deteriorating in the fattening pen are far from uncommon. A coop 3 ft. high, 2 ft. wide, and 4 ft. long will admit from six to eight fowls; the bottom and front should be of bars 3 in. apart; a board outside, in front, 3 in. wide, will serve as a stand for the food trough. The coop should be kept dark between the times of feeding, by hanging old sacks over the front during the day. Sleep and warmth promote fattening; but stale food, irregular times, coops in draughts and places not protected from cold, and the sight of fowls at liberty, do not. The coops should be about $3\frac{1}{2}$ ft. from the floor, and underneath strew ashes or dry earth, mixed with powdered lime, so that the droppings of the fowls may be easily removed. Perhaps the best class of fowls for fattening purposes is a heavy docile sort, or crosses of these breeds with each other or with an Indian game cock.

Pig-Feeding Experiments.

During the summer months of 1907 and 1908 experiments were carried out on pigs at the Clonakilty Agricultural Station, the immediate objects of which were to ascertain the value of separated milk for pig-feeding, and to determine how far the price of pork may fall before it fails to give one penny per gallon for the separated milk. The answers to the two problems, as they appear to be furnished by the experiment, are as follows:—Separated milk fed to pigs along with meal and potatoes gave a return of about 2d. per gallon when pork was sold at 48s. 3d. per cwt., the average price realised for the pigs sold. An increase of 7s. per cwt. in the price of pork was equal to an extra penny per gallon for the milk. To return 1d. per gallon for the separated milk pork must not fall below 40s. 4d. per cwt.

Of the different factors that determine the value of separated milk for pig-feeding the most important is the price of pork current when the pigs are ready for the market. Between the times the experimental pigs were sold pigs of equal quality were sold off the farm at 39s. per cwt.; and as the price paid for meal was slightly higher in the latter case the return for milk must have been under 1d. per gallon. The question naturally arises does it pay to feed pigs without milk? Where a market can be got for saleable potatoes it is very doubtful whether they should be fed to pigs. More especially is this the case where milk does not enter into or only forms a very small part of the food.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

THE Dundee Agricultural Society held their Seventh Annual Show at Dundee on the 11th June. The show was formally opened by the Hon. C. O'Grady Gubbins, M.L.A., who, in the course of his remarks, said that he had gone around the show, and was of the opinion that it was a credit to the district and the Colony. There were over one thousand entries. The poultry section had an exhibition second to no country show in South Africa, and this section was doing good work in helping the farmers to improve their fowl yards by encouraging the best strains. It was still a matter for regret that the mainstay of these shows—the cattle—were absent. He thought that no show was complete when the lowing of the cattle was absent. He was pleased to notice the great improvement in sheep, and the farmers who were buying expensive stock in order to improve their sheep deserved every credit. The dog section also showed improvement, and the horses were about on a par with last year. As to the bottled fruit and other items dear to housewives, he only wished that he had a larger bag with him, so tempting did they look. He then declared the show open, and wished the Society every success.

The show was a great success from a financial point of view; and, whilst it was a good exhibition all round, particular mention must be made of the poultry section, in which the entries this year were double those of last year, and the competition was keen in most of the classes.

DALTON.

A special general meeting of the Dalton Farmers' Co-operative Association was held at the Dalton Hotel on 22nd May, with Mr. Wm. Schroeder, J.P., in the chair. The number of members present was not large.

In opening the discussion of the first notice on the agenda paper—"To alter, if advisable, Rule 24, which refers to the amount of commission charged on the sale of produce by the Association from 2½ per cent. to 1½ per cent., or to any other sum to be decided on,"—the Chairman explained that the directors had been watching the working of the Society for some time, and they had decided to place this proposition before it. They thought that by so doing the business of the Association would be largely extended; he also pointed out that since the large export of mealies oversea began the mealie trade had altered completely. He

wished them to understand that he did not mean there was now no need for the Association; in fact, it was of more use and value to the farmers than before, but at the same time he thought he understood why so many farmers held aloof. He asked them, for the sake of argument, to admit for the time being the value of the Association to that and to the surrounding districts. He then explained that many farmers derived full benefit from the Association without being members, and he suspected the present objection to the Society was the percentage charged, *viz.*, 2½ per cent., which many considered excessive. It might seem so; but in reality it was not. The members must remember that to a certain extent the Society controlled the price of mealies in that and the adjoining districts, and without that control he was sure prices would drop considerably—in fact, far below the 2½ per cent. which they had to pay at present. But, as he stated, the directors had fully gone into the matter, and, hopeful of getting the full support of all the farmers in that and the adjoining districts, they had decided to place the present proposition before the members. He trusted if it was carried that all members would be loyal and support the Association, more especially as it would be to their own interests to do so. He would say no more, as he was sure every member present fully understood the position, but would be pleased to hear this matter fully thrashed out and a decision arrived at whereby the position of the Society would be improved.

Mr. H. E. G. Fannin said the Chairman had gone fully into the matter, and he had not much to add, but he must express his regret at the want of loyalty to the Society. He was sure they all admitted the value to farmers of the Association, but in many cases their support was only given half-heartedly. They did not always give their manager a chance to do his best. They came to him and asked him what he could give for mealies. Surely they knew he could never promise a price till they were sold; and when he told them this and mentioned the last price he had sold at, some of them went to other buyers and upon the price given by the manager often were able to get a penny or more promised, especially when the mealie market was likely to firm up in price. He trusted the proposition to reduce the charge would be carried, as he was sure none would sell outside the Association when the amount charged was so small, *viz.*, threepence in the pound, especially as this covered all risks. They all knew that the Society was responsible for all payments, but to obtain best prices they must put the grain entirely in the hands of the manager, and then he, with the stock he held, would be better able to command fair prices.

After some discussion, Mr. W. Misselhorn moved that Rule 24 be altered to read as follows:—"The Association will collect all moneys, or use its best endeavours to collect all moneys, for the produce of members, sold by it; and immediately on receipt will pay over the

moneys collected to the individual members who supplied the produce, deducting a commission of $1\frac{1}{4}$ per cent."

The suggested alteration was unanimously agreed to.

The advisability of altering Rule 4, so as to permit of the increase of the number of directors to be elected annually from three to five, was next discussed, and it was agreed upon that the rule in question should be altered to read as follows:—"A general meeting of members shall be held on the last Saturday of April, and at such meeting five members shall be elected as directors to hold office until the next annual meeting and the election of successors."

Messrs. J. A. Westbrook and W. Meyer were elected directors for the ensuing year.

This concluded the business of the meeting.

Correspondence.

DIPS AND SALIVATION.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR.—Will you please advise me on the following:—

1. Is there any danger to human beings in washing cattle with the arsenical dip as per Government Bacteriologist's Report? I refer to the natives' hands and arms.

2. If so, what are the best steps to take to prevent salivation, and remedy?

Trusting you will favour me with an early reply.—I am, etc.,

BERNARD CRESSY.

[We are informed by the Government Bacteriologist that no danger exists of salivation occurring through the use of the Laboratory Dip.—
Ed.]

Building air-castles is light work, but it won't make the hen lay, the eggs hatch, or the little chicks thrive.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of May, 1909 :—

COLLIERY.	Average Labour Employed.					Output.	
	Productive Work.			Unproductive Work.*	Total.		
	Above Ground.	Below Ground.	Total.			Tons.	Cwt.
Natal Navigation ..	357	511	868	23	891	19,417	0
Glencoe (Natal) ..	165	365	530	41	571	12,104	0
Durban Navigation ..	182	418	600	—	600	11,831	0
Elandslaagte ..	256	504	760	35	795	11,667	17
South African ..	106	293	399	65	464	11,151	14
Dundee Coal Co. ..	294	443	737	—	737	11,105	11
St. George's ..	213	367	580	9	589	9,747	0
Natal Cambrian ..	181	291	472	—	472	8,974	10
Talana... ..	142	398	540	24	564	7,189	19
Newcastle ..	84	361	445	—	445	5,377	10
Hiobane ..	83	216	329	41	370	5,064	18
Natal Steam Coal Co. ..	73	184	257	13	270	3,922	1
Ramsay ..	93	142	235	6	241	2,508	15
Hatting Spruit ..	97	106	203	—	203	1,618	1
West Lennoxton ..	54	79	133	—	133	1,595	19
Ballengeich ..	37	50	87	39	126	870	7
Central ..	24	45	69	—	69	810	17
Zululand ..	20	16	36	—	36	188	0
Vaalbank; ..	—	4	4	4	8	5	12
Totals ..	2,461	4,823	7,284	300	7,584	125,170	11
Corresponding month, '08	2,258	5,272	7,530	422	7,952	136,484	8

	Productive Work.			Unproductive Work.	Total, May, 1909.	Total, May, 1908.
	Above Ground.	Below Ground.	Total.			
Europeans	193	143	336	37	373	367
Natives	853	3,187	4,040	184	4,224	4,361
Indians	1,415	1,493	2,908	79	2,987	3,224

* Cost Charged to Capital Account.

† April Return.

Mines Department, Maritzburg, 8th June, 1909.

CHAS. J. GRAY,
Commissioner of Mines.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of May, 1909 :—

	Tons.	Cwt.
Bunker Coal	51,140	13
Coal Exported	38,984	8
Total ..	90,125	1

Customs House, Port Natal
1st June, 1909.

GEO. MAYSTON,
Collector of Customs.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain- fall in 1 day.		Total for Year from 1st July, 1908.	Total for same period from July 1st, 1907.
					Fall.	Day.		
Adamshurst	81	38	2.91	7	0.88	16th	—	—
Hilton	79	40	3.79	9	1.1	8th	43.30	37.29
P.M.B., Botanical Gardens	—	—	2.85	8	0.83	8th	38.15	38.20
Ottawa	—	—	5.77	8	4.33	12th	37.44	42.47
Equeefa	88	51	6.40	10	4.85	12th	42.30	47.84
Umninto, Beneva	—	—	5.92	7	2.92	11th	41.55	52.61
Umhlangeni	—	62	5.00	8	2.56	12th	41.55	—
Reit Vei	—	—	2.55	7	0.73	11th	32.90	27.65
Brauxholme	88	48	5.25	10	1.65	12th	64.19	66.06
Winkel Spruit	87	49	6.15	11	4.96	11th	43.05	48.19
Cedara—Hill Station	80	38	3.04	8	0.88	31st	—	—
Vlei Station	79	30	2.88	9	0.85	1. th	—	32.53
Weenen	83	29	2.11	6	0.72	17th	—	—
Giut's Castle	65.2	42	2.79	5	1.92	17th	49.23	—

Return of Farms at Present under Licence for Lung sickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith	Scab	J. A. Good ..	Matiwana Hoek
		"	J. de Waal ..	Lombard's Kop
		"	W. Wright ..	Maggiesdale
		"	W. M. G. Bowers ..	Zieberg
A. B. Koe	Portion of Estcourt	"	E. Moreland ..	Leit Kuil
		"	M. & H. Hatting ..	Amatamo
		"	J. C. Potgieter ..	P. tgieters Drift
		"	C. Blacker ..	Rietfontein
A. C. Williams ..	Utrecht	"	J. R. van der Merwe	Welgekezen
		"	G. T. van Rooyen..	Groot Vlei
		"	S. Botha ..	Uitzoek
		"	Jan ..	Kromelenboog
		"	Umlumbo ..	Twyf l ontein
		"	Umtellen ..	Do.
		"	Unisloeta ..	Klipspruit
H. Van Rooyen ..	Bahanango	"	W. Kruger ..	Goei Gelooft
		"	G. Haines ..	De Waal
L. Trenor	Alfred	Lung sickness	Stekwana ..	Haitstogd
		Scab	Sulwana ..	Location
		"	Yalwayo ..	"
		"	Dumas ..	"
		Lung sickness	Uyimbi ..	"
		"	M. tshwa ..	Msingopansis Kraal
		"	M. Clothier ..	Slexcel
		"	E. M. Etheridge ..	Selhurst
		"	John Ryan ..	Norburg
		"	J. J. Oosthuis ..	The Gorge
		"	J. H. Payn ..	Burnside
		"	Bycia's Kraal ..	T. Lynn's Location
		"	R. Fann ..	Blackwater
		"	F. Mzizi ..	Lot r, Enquabeni
		"	E. Mzizi ..	Lot " F, E. quabeni
		"	J. T. Clothier ..	Whitecliff
		"	J. J. Oosthuis ..	Harding Town Lands
		"	Swenyas ..	Blackwater
		"	G. Larkan ..	Antloch
		"	Injongwed ..	Eydal M unt
		"	Mdingwas ..	Lot 3
		"	C. Knox ..	Knoxwood
		"	Sigum ..	Lot F
		"	Ndhlankunzie's Kri	Location
		"	Noganes ..	Harding Gate
		"	Mncanasa Kraal ..	Mount Pleasant
		"	Bodhlaginis ..	No. 1 location
		"	Mqnnansia ..	Omaga
		"	Spinggan ..	Hawarden
		"	P. Ulbrecht ..	Inluku
		"	Jabula and Sonjela	Mount Pleasant
		"	Incabi ..	Location
J. Rulfe	Lion's River ..	Scab	Makelru ..	"
		"	C. J. King ..	Lynedoch
		"	C. Strapp ..	Oatlands
		"	W. M. Henderson ..	Hilton
		"	Smith & Braithwaite	Lo-kop
C. T. Vaughan ..	Paulpietersburg ..	"	P. Allen ..	Welverdiend
		"	J. M. van Rooyen..	Halberton
		"	Lucas van Rooyen..	"
		"	P. van Rooyen ..	"
		"	C. M. Webb ..	Papkinvlei
		"	Jan van Rooye i ..	Halberton
		"	G. Dekker ..	Paardfontein
		"	H. Stadler ..	"
		"	P. Marais ..	Maketeeskop
		"	L. Moolman ..	Rooipoort
		"	H. Potgieter ..	Maketeeskop
		"	G. Combr nk ..	G luk
R. Wingfield Stratford	Newcastle	"	C. Mavuga ..	Koppie Allen
		"	D. A. Drummond ..	Bryon
		"	C. J. Kaap ..	The Nek
		"	M. Worth ..	Bernard
		"	M. Mor ison ..	Le pard Kloof
		"	W. Osborn ..	Beshoek
		"	Rapane ..	Walmesley
		"	W. Moller ..	Mardenash

RETURN OF FARMS UNDER LICENCE (Continued).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWN. R.	FARM.
C. E. Walker ..	Portion of Estcourt ..	Scab	Oates, W. E. ..	Oatsdale
G. Daniell ..	Vryheid.. ..	"	Henderson, A. ..	Malbrake Full
		"	M. Kunzwana ..	Vredhof
		"	W. F. Hein ..	Geddeloof
		"	Mrs Heynes ..	Brakpan
		"	Manguh ..	Hardetaald
		"	Mkelegana ..	"
		"	P. M. Bester ..	Lenwnek
		"	A. Steenkamp ..	Driekwart
		"	Mzinzi ..	Groenkok
		"	Kuyeze ..	Mooiplaat
		"	Jantje ..	Trad
		"	Sgnangene ..	"
		"	Velapi Zondi ..	Bedrog
		"	A. Zitu ..	Mooiplaats
		"	Mk tshwa ..	Vergelegen
		"	W. Labuschagne ..	Wetevreden
		"	Mt bene ..	Kambula
		"	E. E. Dalton ..	Bethel
		"	P. Labuschagne ..	"
		"	L. Botha ..	Waterfall
		"	J. B. Thompson ..	Noortverwach
J. R. Cooper ..	Nkandhla & Nqutu ..	"	E. Potgieter ..	Someweld
E. Varty ..	Western Umvoti ..	"	Ncede Biyela ..	Mpandhlani
		"	Mgele Biyela ..	"
		"	W. R. J. van Rooyen ..	Rustenburg
		"	D. C. S. Nel ..	Higafeld
		"	L. J. van Rooyen ..	Driefontein
K. Ripley ..	Emtonjaneni ..	"	H. Hausmeyer ..	Onres
		"	Kehla ..	Crown Lands
J. F. van Rens' urg..	Ngotshe ..	"	Magwehlha ..	Morgenzon
		"	J. Potgieter ..	Kenderlage
		"	A. C. Delpert ..	Wonderfont in
		"	J. Jacobitz ..	Zuifigen
		"	Hlekizane ..	Lisbon
		"	Mbumbo ..	Frsgewacht
		"	Getshu ..	Driefontein
		"	A. J. Swart ..	Reilfontein
		"	P. J. van Vuren ..	Driefontein
		"	C. S. Fouché ..	Kondelag
J. Stewart ..	Bergville ..	"	Mjanja ..	"
E. W. Larkan ..	Umsinga ..	Lungsickness	Menu ..	Kleinwaterfall
		Scab	O. Zunkel ..	Rustenburg
		"	Amos Nahl vu ..	Nazareth
		"	Oyugnlungans ..	Umsinga
		"	Gogo ..	Somshoek
		"	Tubatula ..	Nazareth
		"	Avon Mdodu ..	Grootvlei
		"	Muhkwa ..	Somslock
		"	Gwambula ..	"
		"	Mkerenis ..	Gordon Memorial
		"	Nyonica wye ..	Maza' ap
		"	George ..	Gordon Memorial
		"	Balana ..	Ndayance
		"	Tshantulu ..	Umsinga
		"	Susezulu ..	"
		"	Ngongola & Somseu ..	"
		"	Nthubusu ..	Gordon Memorial
		"	Movenwa ..	Umsinga
		"	Sandhlwana ..	"
R. Mayne ..	Eastern Umvoti & Krantz kop ..	"	Nynmans ..	"
		"	J. A. Nel ..	Welgegund
		"	J. Keyter ..	Elandskop
		"	J. T. Martins & nts ..	Brodershoek
		"	Macalingani ..	Loots Hoek
E. W. Bowles ..	Ixope ..	"	O. H. Havemann ..	Summerford
		"	Ngevana ..	Arundel
		"	Bogwin ..	"
		"	Geisani ..	"
		"	Maxewana ..	Klepat
		"	No'lwengw ..	"
		"	Ncopo ..	"
		"	Vuguza ..	"
		"	Putaza ..	"
		"	Nduba ..	Waverley
		"	Njunga ..	South Hills
		"	Makafana ..	Waverley
		"	Dumdum ..	Kolston
		"	Nqaye ..	Waverley

RETURN OF FARMS UNDER LICENCE (Continued).

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
E. W. Bowles ..	Ixopo ..	Scab	Umenyana ..	Kolston
			Mancansika ..	"
			Unvakatshe ..	"
			Umbabala ..	Iprisugval
			Kebe ..	Location No. 6
			Luzi ..	Location
			Sabexa ..	Springvale
			Janga ..	Location No. 6
			G. Way ..	Herdstone
			Njoyetala ..	Lot 29
			Theiwana ..	Lot 55
			Samtombi ..	Eme ad
			Gungatshi ..	Location No. 3
			G. Thomson ..	Valahalla
			G. H. Cooper ..	Avetary
			D. E. Hardman ..	Ellington
			W. W. Watson ..	Rocky Halton
			Turana ..	Lot L.H.
			Mandemba ..	Lot D.U.
			Tebenga ..	"
			E. F. Garland ..	Springvale
			E. W. Veley ..	Ay horpe
			L. Howes ..	Mornington
			Gangadene ..	Coolhill
A. H. Ball ..	Weenen..	"	Solabamba ..	Gorton
			Godhloza ..	"
			J. Johnson ..	Vlei Cottage
			J. P. Lotter ..	B. rg Vle t
			P. H. Van Rooyen ..	Ruffels Hoek
			W. O. Harding ..	Melietuin
			W. M. J. Lotzer ..	Waterfall
			L. C. Kinsman ..	Mount Moriah
			P. P. van Rooyen ..	Doornkloof
			P. J. van Rooyen ..	Middleburg
			G. J. v d W. s huizen	Winterhoek
			G. J. v d Westhuizen	"
F. Kruger (acting)..	City, Unigeni ..	"	Naude & Lotter ..	Scottshoek
			J. T. van Rooyen ..	Belle Vue
			Mrs. Hair & Sons ..	Oribi Vlakke
			Univeli ..	Zwaartkop Location
			Dria ..	"
			Samuel ..	"
			Jan'tje ..	"
			Laduma ..	"
A. J. Marshall ..	Dundee..	"	L. Taylor ..	"
			Ramen ..	Ellis' Estate
			J. Henwood ..	Hilton Road
			A. C. Vermaak ..	Siguma
			T. C. Vermaak ..	Harrisdale
			J. W. de Br yn ..	Rooifontein
			B. J. Badenhorst ..	Kem enveldt
			L. Badenhorst ..	Kelvin
			H. A. J. Davel ..	Kliprug
			C. T. Vermaak ..	Kalderfontein
B. Klusener ..	Lower Umzimkulu..	Lungsickness	H. P. Handley ..	Giba
			D. C. Uys ..	Parys
			Nyapu ..	Berbeck

MANGE IN HORSES EXISTS AS UNDER

Owner.	Farm.	District.
Pinda, Vete & Sobuon ..	Strathsoen	Impendhle
Natives ..	Olivefonte	Unvoti
Natives ..	Tetworth	Lion's River

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified:

ON THE 7TH JULY.

New Hanover.—Grep donkey stallion, probable value £10, no brands. Impounded by Mr. G. Handly on 23rd May.

Krantzkop.—Brown mare donkey, white nose, aged, no brands. Brown mare donkey, white belly, white feet, slit right off ear, harness marks on off side, aged, no brands. Dun gelding donkey, black stripe on shoulder-blade, aged, no brands.

Umsinga.—Running on the farm "Sutherland," belonging to Mr. A. Muller, and reported to be too wild to be driven to the Pound, chestnut filly, white star on forehead.

ON THE 21ST JULY.

Utrecht.—Seven ewes, branded A right side. Three ewes, branded T right side.

Dundee.—Six Merino ewes, branded 'J' (in script) on back.

Nqutu.—Four Kafir goats, 2 white (he), 1 brown (she), 1 kid.

Normandien, Newcastle.—Bay gelding, 14 hands, 4 year old, no brands or ear marks, star on forehead, near hind foot white.

Woodstock, Bergville.—Whitish grey Kafir goat, ewe end cut off right ear, piece cut off front and a hole in same, end off left ear and slit in same. Black Kafir ram goat, nicks out of back and front of right ear, swallow tail end of left ear. White Kafir ram goat end off and slit in right ear, slit in end and nick in back of left ear.

Babanango.—Five mixed Kafir goats.

Agricultural and Other Shows, 1909.

GREYTOWN (Umvoti Agricultural Society).—Date not fixed. W. H. Gibbs, Box 24, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Date not fixed. E. V. Bambrick, Box 90, Ladysmith, *Secretary*.

NEW GERMANY (Durban County Farmers' Association).—No separate show contemplated; but it is intended to join the Durban and Coast Society for the purpose of making complete exhibit of Durban products.

UMZINTO (Alexandra Agricultural and Horticultural Association).—Show, 8th July. George Lamb, Box 68, Umzinto, *Secretary*.

CAMPERDOWN (Camperdown Agricultural Society).—Show, 23rd July. Messrs. Walker & Burchell, Camperdown, *Secretaries*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—7th, 8th and 9th July. J. Morley, 399, Smith Street, Durban, *Secretary*.

DURBAN (Durban and Coast Poultry Club).—Show, 14th, 15th and 16th July. H. M. Fletcher, 26, Castle Arcade, Durban, *Secretary*.

NEW HANOVER (New Hanover Agricultural Association).—Show, 30th July. W. D. Stewart, New Hanover, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Byrne Farmers' Association; Eshowe District Farmers' Association; Richmond Road Farmers' Association; Donnybrook Farmers' Association; Ladysmith Farmers' Association; Hatting Spruit Farmers' Association; Boston Farmers' Association; Little Tugela Farmers' Association; Umvoti Farmers' Association; Highflats Farmers' Club; Vryheid Agricultural Society; Garden Castle Farmers' Association; Nottingham Road Farmers' Association; Seven Oaks Farmers' Association; Richmond Agricultural Society; Slangrivier Boeren Vereeniging; Ingogo Farmers' Association; Frere Farmers' Association; Dronk Vlei Farmers' Association; Lower Tugela Division Association; Umsinga Biggarsberg Farmers' Association; Ixopo Farmers' Association; Bergville Farmers' Association; Mid-Illovo Farmers' Club; Upper Biggarsberg Farmers' Association,

Government Cold Stores and Abattoirs.**PIETERMARITZBURG.**

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

	Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
			Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300 lbs. weight.	Over 300 lbs. weight.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1. Receiving per head	0 3	0 6	0 6	0 6	0 3	0 3
2. Killing and Cleaning "	2 3	3 6	2 9	3 3	2 6	3 0
3. Labour "	0 3	0 6	0 3	0 6	0 3	0 6
4. Disinfectants "	0 1	0 1	0 1	0 1	0 1	0 1
5. Bagging (4 Quarters) ... per body	1 9	3 0	2 6	2 9	2 3	2 6
6. Cleaning of Tripes each	0 6	0 6	0 6	0 6	0 6	0 6
7. Chilling of Beef, up to 72 hours or portion thereof per body	1 0	2 9	2 0	2 6	1 9	2 6
8. Chilling of Offal, up to 72 hours or portion thereof per set	1 0	1 0	1 0	1 0	1 0	1 0
Chilling and Freezing Beef—						
9. 1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10. 2nd " " " " "	1 0	4 0	3 3	3 6	3 3	3 3
11. 3rd and remaining weeks or portions thereof "	0 8	3 0	3 0	3 0	3 0	3 0
Chilling and Freezing Offal—						
12. 1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13. 2nd " " " " "	1 0	1 3	1 0	1 0	1 0	1 0
14. 3rd and remaining weeks or portions thereof "	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars, apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

Farm Apprentices' Bureau.

LIST OF APPLICANTS.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

- | | | | |
|-----|-----|---------|--|
| No. | 2. | Age 15. | Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch. |
| „ | 3. | Age 24. | Colonial born Has a knowledge of bookkeeping. |
| „ | 4. | Age 18. | Natal born. Anxious to learn. |
| „ | 5. | Age 24. | Speaks Zulu. |
| „ | 6. | Age 17. | Still at school. Speaks French fluently, and has a fair knowledge of German and Dutch. Is very well educated. Particularly anxious to learn farming. |
| „ | 7. | Age 15. | Is keenly interested in farming. |
| „ | 9. | Age 17. | Speaks Zulu and Dutch. Is particularly anxious to learn farming. |
| „ | 12. | Age 17. | Natalian. |
| „ | 13. | Age 20. | Is an orphan. Is anxious to learn farming. |
| „ | 14. | Age 16. | Natal born. |
| „ | 15. | Age 19. | Is desirous of learning farming. |
| „ | 16. | Age 21. | Has had some experience on a mixed farm at Besters. Speaks Zulu. Is keenly interested in farming. |
| „ | 17. | Age 20. | Speaks Zulu. Is keenly interested in farming. |
| „ | 18. | Age 21. | Speaks Zulu. Is keenly interested in farming. |
| „ | 19. | Age 17. | Speaks Zulu. Is keenly interested in farming. |
| „ | 25. | Age 23. | Bricklayer by trade. |
| „ | 26. | Age 18. | Has a knowledge of Zulu. Was brought up in a farming district in Scotland. |
| „ | 27. | Age 19. | Has had one year's experience in the Cape. |
| „ | 28. | Age 19. | Colonial born. Understands carpentering. Keenly interested in farming. |

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 237, Pietermaritzburg.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 120.—Colonial born, 26 years of age, steady and an abstainer, carpenter by trade, and has had four years' experience of mixed farming in Natal, speaks Zulu and understands Dutch, desires to obtain employment on a farm (Northern District or the O.R. Colony preferred).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep for a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

There is no quick way of building up a dairy herd. It takes years of careful breeding.

FEES FOR AGRICULTURAL ANALYSIS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for Sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

MAIZE SEED.

Growers who may have for sale selected seed of the following types of maize are invited to communicate as early as possible with the Director, Cedara :—Horse Tooth, Hickory King, Boone County, Golden King and Yellow Dent.

POULTRY.

Orders will be received for selected cockerels of the following breeds for immediate delivery :—Buff Orpingtons, White Minorcas, Silver Wyandottes and Plymouth Rocks,

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

DEVON BULLS.

Offers are invited for three young South Down bulls, by imported bull, "Star of the West." Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.

Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.

Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.

Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.

Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.

Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.

Agricultural Seeds, etc., for Irrigation Farming.—Curator, Government Station, Weenen.

Fruit.—Orchardist, Cedara.

Accounting Business.—Accounting Clerk, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry,
Cedara.

The well-developed brood sow produces the best results. Do not breed too young.

Executives of Farmers' Associations.

*** The Editor will be obliged if the Secretaries of Farmers' Associations and similar institutions will kindly keep him advised with regard to changes in the personnel of their Executives.*

ALEXANDRA AGRICULTURAL AND HORTICULTURAL ASSOCIATION.—President: Wm Thompson. Hon Vice-Presidents: A Blamey, E W Hawksworth, Thos Kirkman, H Basley, J L Knight, R.M. Hon Secretary and Treasurer: Geo Lamb. Hon. Auditor: W B Brunner. Committee: W Arnott, H G Arbuthnot, R C Archibald, R G Archibald, J Bazley, A Behrmann, W Cooke, G J Crookes, R Cruickshank, H D Hawksworth, H E Hawksworth, A F W Hawksworth, R C Hawksworth, J Landers, D McAndrew, F Nelson, C A Preston, Dr. Rouillard, W A Gilbert, Fred Blamey, Rev B M Ford, S C Hawksworth, J C Landers, S F Crookes, J J Crookes, R A Lindsay, J A Curle, F B Preston, R Parkin, H Reynolds, J B Stewart, C Taylor, H H P Waller, J Ross, Rev W C Wilcox, Dr W P Tritton.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A G Prentice, J.P. Vice-Presidents: C Knox, J.P., L T Trenor, and C A Holwell. Hon. Secretary and Treasurer: H C Hitchins. Committee: C M Etheridge, R Fann, J.P., V Hitchins, S Aitchison, J.P., W B Rethman, Dr Case, J.P., H Rethman, R G Mack, J Hogg.

BOSTON FARMERS' ASSOCIATION.—President: Thos. Fleming, J.P. Vice-President: T. W. Rudland. Hon. Secretary: W. J. Fly, J.P. Hon. Treasurer: H. A. Phipson.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J Gavin and John W Harvey, J.P. Hon Secretary: W E Allsopp.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon, J.P. Vice-President: F N Meyer. Hon Secretary: J Baker. Committee: H Baker, J Gavin, J W Harvey, J.P., W B Turner, H H Hutton, C Baker, H E Meyer.

CHARLESTOWN FARMERS' ASSOCIATION.—President: Johannes Vos. Vice-President: — Adendorff. Secretary: W. J. Curnow. Treasurer: J. O. Thomas. Committee: H. O. Eksteen, J. P. Vos, J. C. Uys, W. G. Thomas, D. Doyer, F. A. R. Johnstone, M.L.A., G. E. Lane, S. R. Higgins, B. F. Johnstone, A. J. Johnstone, J. J. Eksteen, R. H. Greaves, Peter Thompson, G. McArthur, and V. B. van Rooyen.

DRONK VLEI FARMERS' ASSOCIATION.—President: Capt Perceval. Vice-President: Alban Hodson. Hon Secretary and Treasurer: Edward Marriott.

DUNDEE AGRICULTURAL SOCIETY.—President: T. P. Smith. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, F. Thurton, and W. Craig. Hon. Secretary and Treasurer: J. McKenzie. Committee: A. W. Smallie, W. J. H. Muller, G. M. de Waal, B. J. Humann, R. Retallaack, H. Ryley, H. J. Head, C. T. Vermaak, H. P. Walker, J. Dyson, H. Wiltshire, J. Campbell, H. Greenhough, D. W. H. Tandy.

DURBAN AND COAST SOCIETY OF AGRICULTURE AND INDUSTRY.—President: E. W. Evans. Vice-Presidents: Sir B. W. Greenacre, A. M. Campbell, Hon. Marshall Campbell, M.L.C., W. Adams, Frank Stevens, C.M.G., M. S. Evans, M.L.A., P. D. Simmons, W. R. Poynton, Hon. C. G. Smith, M.L.C., G. S. Armstrong, M.L.A., H. R. Bousfield, W. G. Brown, C. Henwood, J. Livingston, John Nicol, C.M.G., H. H. Puntan, R. H. Wisely, V. Seymour, H. Sparks. Secretary: John Morley. Committee: J. Ellis Brown, J. Burman, C. A. L. Bull, D. Doyle, Samuel Deane, James Henderson, W. Konigkramer, W. D. Kimber, W. J. Mirrlees, W. Milne, J. Swales, W. J. Thompson, C. Wilson, Wilfred Payne, Wallis Short, S. T. Amos, J. McBride, F. M. Hillier, W. A. Stocken, and W. A. Bath. Treasurer: Edwin Greenacre. Auditor: W. Murray Smith.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J H Colenbrander. Presidents: J McIntosh. Vice-Presidents: H Westermeyer, R R McDonald. Committee: F R W Behmer, G Compton, H Freese, W Freese, W Gillitt, H W Konigkramer, H W Nichols, F Schaefermann. Hon Secretary and Treasurer: Frank J Volek.

EMPANGENI AND DISTRICT SUGAR PLANTERS' AND FARMERS' ASSOCIATION.—President: Col. C. B. Addison. Vice-President: P. Stott. Secretary and Treasurer: F. Piccione, P.O. Empangeni. Executive: P. Addison, G. Higgs, — Salveson, — Blake.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J R Pennefather. Vice-President: C F Adams. Secretary: T Parkins. Treasurer: W T Brockwell.

GOURTON FARMERS' ASSOCIATION.—Chairman: M Sandison. Vice-Chairman: R Gray. Hon Secretary and Treasurer: Frederick B Burnard, Highfield P.O. Committee: Dr Landon, J.P., E Reed, J Woods, C van der Merwe.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: A W Smallie. Vice-President: Thos Brookes. Hon Secretary and Treasurer: R J Hearn. Committee: G Queddon, N Glutz, Wm Craig, W R Quedsted, W T Heslop, Thos Dewar, A E Norman, D P Campbell, J J Grove, H J Hearn, D W H Tandy, J B Pendar, J Campbell, J Barbour.

HINEVILLE AGRICULTURAL SOCIETY.—President: Henry C Gold, Dartford, Underberg. Vice-Presidents: F E Peto, G H Royston, J B Nicholson. Hon Secretary and Treasurer: G Palframan, Watermead, Underberg. Executive Committee: G Malcolm, W S Johnston, P McKenzie, F E Peto, J S Gordon. Yard Steward: D T Malcolm. Auditors: T C Dearlove and F E Peto.

HOWICK FARMERS' ASSOCIATION. — Chairman: Thos Morton. Vice-Chairman: M A Sutton. Hon Secretary and Treasurer: A Clark.

INGOGO FARMERS' ASSOCIATION.—President: E. W. Noyce. Vice-Presidents: G. A. Finstone and D. A. Drummond. Hon Secretary and Treasurer: C. Drummond.

IXOPO AGRICULTURAL SOCIETY.—President: F L Thring, J.P. Vice-Presidents: Col W Arnott, B.M.R., W K Anderson, J.P., C E Hancock, J.P. Committee: John Anderson, Thos Allen, J C Auld, H D Archibald, F S Benningfield, S Boyd, T L Clarence, F E Foxon, R.M., Wm Foster, Jis T Foster, C C Foster, Geo E Francis, L Gray, A M Greer, J.P., J R Greer, Wm Gold, H A Hill, C F Harris, A E Keith, R Kennedy, Geo Martin, W Oakes, L J Phipps, T F Remfry, J W Robinson, Jas Schofield, M.L.A., D C Small, A Stone, W R Way, A H Walker, M.L.A., P D Webb. Hon Secretary: G C Way, Hon Assistant Secretary: A G Harris. Hon Treasurer: T Arnott.

IXOPO FARMERS' ASSOCIATION.—President: C. E. Hancock, J.P. Vice-Presidents: T. F. Remfry and R. Vause. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: Col. Arnott and T. F. Remfry, with W. D. Campbell as reserve. Committee: John Anderson, W. Oakes, D. Campbell, G. C. Way, James Foster, A. Keith, G. Martin, F. Z. Thring, A. C. Kirkman.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Daniel Bester. Vice-Presidents: Herman Illing, J G Bester, Wm A Illing. Secretary and Treasurer: Edward V Bambrick (Box 90, Ladysmith). Executive Committee: A Brink, J Farquhar, C.M.G., M.L.A., W C Hattingh, J G Hyde, Trev Hyde, A I Horsley, W Freer, L A Leonard, H Nicholson, H C Thornhill, Herman Illing, D Munger, P de Waal, J H Newton, D Sparks, J.P., J T Francis, A W (Gus) Illing, G Pinkney, W Cochrane, George L Coventry, and *ex officio* officers.

KRANTZKOP FARMERS' ASSOCIATION.—President: Capt M Landsberg. Vice President: P R Vermaak. Hon Secretary and Treasurer: G T van Rooyen. Committee: C J van Rooyen (Albany), C J van Rooyen (Wonderfontein), J. A. G. Mare, L M van Rooyen, Jnr, R P Martens, J P Nel, Dr Proksch, and F E van Rooyen.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson. Vice-President: H Nisbet. Executive Committee: H Nisbet, M A Sutton, A J Holmes, J Humphries, Jno Pole, and W A Lawton. Auditor: W J R Harvard. Hon Secretary and Treasurer: Arthur F Dicks, P.O. Box 1, Howick.

LITTLE TUGELA FARMERS' ASSOCIATION.—President: F van de Waal. Vice-President: F G King. Secretary and Treasurer: H L Frances. Auditor: A D Buchanan. Committee: P R Summersgill, F W Holmes, J P Wepenaar, J J Harding, Max Cameron.

LOTENI FARMERS' ASSOCIATION.—President: J A Tod. Vice-President: T Carter. Hon Secretary: A Kennedy Stone.

LOWER TUGELA DIVISION ASSOCIATION.—President: W R Hindson. Vice-President: A E Foss. Hon Secretary and Treasurer: H Curtis Smith (Stanger). Committee: A S L Hulett, F Addison, G Stewart, T G Colenbrander.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D C Aiken, J.P. Vice-Presidents: H Albers and C H Mitchell, J.P. Hon Secretary and Treasurer: W J Plows. Committee: C Manning, J W Aiken, W G Camp, T F Godwin, J Hutton, H Norden and A Borehard. Hon Secretary, Show Committee: J W Aiken. Show Committee: A E Collison, A Borehard, F Knoop, A Ringo, H F Voigts, J Hutton, C Manning, A J Lugg and H Albers. Hon Auditor: J W Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: L G Wingfield-Stratford, J.P. Vice-Chairman: B B Evans. Hon Secretary: J W V Montgomery. Assistant Hon Secretary: A L Wingfield. Hon Treasurer: Jos McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: R Garland. Vice-President: C B Lloyd. Hon Treasurer: H A Rohde. Collector: Capt W H Stevenson. Auditor: Claude Scott. Hon Secretary: H B Hall.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos Thresh. Vice-Presidents: Wm Lilje, E A Grantham. Secretary and Treasurer, C A Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafen, Fritz Toilage, T Braithwaite, Ernest Rottcher, C H Tibbrook, Rev H Rottcher (Hon Life Member).

NEWCASTLE.—President: F A R Johnstone, J.P. Vice-President: C Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O Schwikkard, C.M.G., Newcastle. Secretary: Wm Beardsall. Treasurer: Ed Nicols. Executive Committee: L H S Jones, E Phillips, H C Caldecott, C Watson, G Langley, W A Lang, W J P Adendorff, J E de Wet, O Davis, S W Reynolds, B Pettigrew, G W Thomas, G H Bishop, H R Muir, M C Adendorff, W Napier, P Van Breda, Chriss Botha, G Templar.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: G C Mackenzie. Vice-Presidents: J C Watt, J.P., and R H Oellermann. Life Member: C A S Yonge, M.L.A. Secretary and Treasurer: W D Stewart, New Hanover. Auditor: J H F Hohls. Committee: W N Angus, E Bently, W W Bentley, Edward Boast, E E Comins, G R Comins, C Crookes, jun, H Dinkelmann, J Duval, W Fortmann, Dr C H Herbert, J Hillermann, J H F Hohls, H Jacobson, H A Light, G C Mackenzie, A F Mackenzie, T M Mackenzie, J Muirhead, J.P., Oswald Muirhead, G Moe, J.P., J Moe, O Moe, C Oellermann, F Oellermann, C J Oellermann, W Ortmann, J C Otto, E Peckham, J.P., J A Potterill, S Peckham, C M Scott, Rev J Scott, Wm Schroeder, J.P., Owen Solomon, J H Smith, Riby Smith, F Thole, H Vorwerk, H F Westbrook, W H Westbrook, C Westbrook, T Wolluter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P. Vice-Presidents: H Mummbrauer, P Roddehorst, W Dralle, W Wortmann. Committee: W Bartels, F Bosse, H Braummer, A J Bruyns, H Bruyns, Carl Dralle, H Gebers, W Gevers, J H Holley, jun, W C Holley, C Hillermann, L Koch, H Kohler, F E Kuhn, M Maister, A Meyer, H Meyer-Estorf, H W Meyer, K A Meyer, H Misselhorn, W Misselhorn, K Peters, I Pfotenbauer, G Rabe, G Reiche, Joh Reiche, W Rencken, H Rosenbrock, H Schmidt, K Schmidt, Rev Jas Scott, K Seele, F J Smith, J Thies, W Witthoft, P Worthmann, A Worthmann, F Worthmann, H Worthmann. Secretary: Paul Vietzen, P.O., Singletree. Hon Treasurer: E Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: B. Greene. Vice-President: Geo Ross. Secretary and Treasurer: C J King, Nottingham Road. Hon Auditor: H Singleton.

PIETERMARITZBURGSCH BOEREN VEREENIGING.—President: D P Boshoff. Secretary: E G Jansen, 313, Loop Street, Maritzburg.

POLELA AGRICULTURAL AND HORTICULTURAL SOCIETY.—President: J Ishister. Vice-Presidents: W H Allwright, J F Alexander, and H Brown. Hon Secretary and Treasurer: J Anderson Speak. Auditor: A Brown. Executive Committee: J Ishister, W H Allwright, J F Alexander, H Brown, H J Gazzard, G W Foster, J Anderson Speak. Hall Committee: W H Allwright, F Crossley, A Brown, with the trustees—J F Alexander, H E Mingey, and Geo Forder.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W P Payn, J W T Marwick, C O and J W McKenzie and Chas Nicholson. Hon Treasurer: R Nicholson. Hon Secretary: Cecil Williams. Committee: Evan Harries, R A McKenzie, H M Moyes, Thos Marwick, J C Nicholson, J W Flett, A W Cooper, J.P., J W Hammond, C B Simes, Tom McCrystal, and the seven office-bearers (*ex officio*).

RICHMOND ROAD FARMERS' ASSOCIATION.—President: Thos Stead, J.P. Vice-President: W Mapstone. Secretary and Treasurer: W L Stead, New Leeds. P.O. Committee: D Malcolm, J Mapstone, W P Payne, J James, J Sinclair, W S Crouch, H B Boyd, W Middleton, W Oldfield, T E Horwood.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G M Sutton, K.C.M.G. Vice-Presidents: W S Crart, Jas King, D C Dick, G J Macfarlane, C.M.G., O Hosking, with His Worship the Mayor, *ex officio*. Secretaries, Treasurers and Collectors: Duff, Eadie & Co, 12, Timber Street, Pietermaritzburg. Yard Superintendent: H J Stirton. General Committee: T J Allison, W H Buchanan, F G Burchell, W H Cobley, P H Campbell, R Comins, W P Gough, E S Goodwill, K H Hathorn, K.C., T W J Hall, J Hall, L Line, Col Sir D Mackenzie, K.C.M.G., Jas Morton, Sir T K Murray, Jno Moon, W J O'Brien, P Otto, R H Popworth, J F Potterill, A Robinson, Rev J Scott, P D Simmons, H Solomon, W L Stead, H J Stirton, Dr Oddin Taylor, F W Jameson, S J Mason. Executive Committee: President, Vice-Presidents, and W J O'Brien, W H Cobley, K H Hathorn, K.C., and Col E M Greene. Members appointed by Corporation: Councillors Ireland, Sanders and Hathorn.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P J Kemp. Executive Committee: J J Uys, J Z Moolman, T J Botha, P J Viljoen, P J Kemp. Hon Secretary and Treasurer, Thys Uys, Utrecht P.O.

UMSINGA-BIGGARSBERG FARMERS' ASSOCIATION.—President: E C Nuss. Vice-President and Acting Secretary: Geo S Saunders, Helpmakaar.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T Menne. Vice-Presidents: Theunis J Nel, M.L.A., W J Slatter, W L'Estrange. Executive Committee: Tol Nel, A Newmarch, W Lilje, O Rottcher, S C Van Rooyen, W Newmarch, E J Van Rooyen, O Norton, I M Nel, J Browning. Managers of Show Yard: J M Handley and N Hunter. Hon Auditor: W K Ente. Secretary and Treasurer: W H Gibbs.

UMVOTI FARMERS' ASSOCIATION.—President: P R Botha (J's son). Vice-President: J M Handley. Secretary and Treasurer: G E Cadle (Box 6, Greytown). Auditor: J M Nel. Committee: W J Slatter, G E Nel, H F Torlage, R J Landsberg, A Newmarch, P H van Rooyen, A F Handley.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: W L Oldacre. Vice-President: G Langley. Hon Secretary: W F B Sutherland.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L Viljoen. Vice-Chairman: B H Breytenbach. Members: I Bierman, M M Knight, J H Klopper, B C Hattingh, T Botha, M Gregory, P L Uys, H P Breytenbach. Secretary: G J Shawe.

UTRECHT BOEREN VEREENIGING.—President: D J A van der Spuy. Secretary: G J Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut-Col F Addison. Vice-Presidents: Sir Liege Hulett, Kt, M.L.A., W J Thompson, Esq, J.P., J Polkinghorne, Esq, M.L.A. Committee: Messrs W H B Addison, G S Armstrong, M.L.A., C Bishop, J.P., D Brown, sen, J.P., W Campbell, T C Colenbrander, A E Foss, J.P., A S L Hulett, J.P., J B Hulett, C Jackson, G Nicholson, J.P., T Polkinghorne, J W Perkins, J.P., E Saunders, J.P., G Stewart, and J H Stansell. Hon Secretary and Treasurer: H Curtis Smith (Stanger).

VRVHEID (WARD I.) AGRICULTURAL SOCIETY.—President: E Dalton. Vice-President: J F Potgieter. Secretary: F Kolbe. Assistant Secretary: H Lombaard. Committee: Secretary, Assistant Secretary, and A von Levetzow, T Ries, P Grobler, F Molman, A Steenkamp.

WEENEN AGRICULTURAL SOCIETY.—President: Allan Stuart. Vice-Presidents: R Garland, R H Ralfe, F I de Waal. Hon Treasurer: F C Schiever. Hon Secretary: E Cautherley. Auditor: S Wolff. Executive Committee: Hon H D Winter, M.L.A., J W Moor, M.L.A., D W Mackay, T H Hindle and L L'Estrange. Manager of Show Yard: S Vaughan. Assistant: A Clouston.

WEENEN COUNTY HORTICULTURAL SOCIETY. Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C J Offord, G W Linfoot, T J Nunn, Dr Brewitt, S Vaughan. Hon Secretary: F Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F W White. Vice-President: C E Symonds. Secretary: R H McAlister. Committee: Hon D C Uijs, A W Symonds, H T James, R J Ortlepp, J N R Dixon.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G H Hulett. Vice-President: C Hill. Hon Secretary and Treasurer: F Brammage, Ginginhlovu.

East Coast Fever Advisory Committees.

(NOTE.—Owing to sparse European population, the following Magisterial Divisions have no Advisory Boards: Ubombo, Mapumulo, Ingwavuma, Mhlabatini, Ndwandwe, Nkaandha and Mlabisa.)

ALEXANDRA.—Chairman: W Thompson, Umzinto. Members: H Bayley, R C Archibald, A Blamey, H Reynolds, G J Crookes, R Parkin, J A Curle.

ALFRED.—Chairman: Magistrate. Members: A G Prentice, Rev. S Aitcheson, J E Brown, F H Boddy, H M Raw, H Rethman, H C Hitchens, H J R Hatchwell, W P Bouserie.

BERGVILLE.—Chairman: T E Zunckel, J.P., Bergville. Members: P H Vander Riet, J G Famin, H Jackson, C Halferty, F Zunckel, Mbulali—Consulting member for natives.

BULWER.—Chairman: Magistrate. Members: R Comrie, Wm Colville, R Gordon, H Cole, P Garson, P McKenzie, G Malcolm, H C Gold, R Justice, E Stafford, W Little.

CAMPERDOWN.—Chairman: A N Kirkman, Cato Ridge. Members: J F Erfmann, P J Kingham, W B Turner, C J A Scheepers, W Mercer, L G Wingfield Stratford, J W Harvey, B B Evans, J W V Montgomery, B R Buchanan, W L Stead. **SUB-DIVISIONAL BOARDS.**—No. 1. *East of Railway Line from "Spitzkop" to Railway Line.*—Chairman: J F Erfmann, Cato Ridge. Members: P J Kingham, H Dinklemann, F L Meyer, J H Meyer, H A Meyer. No. 2. *East of Railway Line from West of Government Fence.*—Chairman: C J A Scheepers, Thorneycubush. Members: W B Turner, W Mills, J F Scheepers, H Nadauld, G S Phipson. No. 3. *West of Railway Line from Konig Krantz to Killairney and along Umlaas River.*—Chairman: A N Kirkman, Clairmont. Members: W Mercer, W Brown, R Godfrey, W S Meyer, E W Meyer. No. 4. *West of Railway Line, rest of Division between Main Line, Umlaas River Boundary of No 3.*—Chairman: W L Stead, Thornville Junction. Members: F H Meyer, J R Schwegmann, W E Schwegmann, W S Crouch, B R Buchanan (Hon. Sec. Manderston). No. 5. *West of Main Line, Beaumont, East of Main Mid-Ullovo River from Westley's Drift to Umquaranta River.*—Chairman: J W Harvey, Camperdown. Members: L G Wingfield Stratford, R Lyne, C A Hutton, E H Hayes, F E Groom. No. 6. *Mid-Ullovo West of Line, rest of Division South of Umlaas River.*—Chairman: B P Evans. Members: J W V Montgomery, J H McCullough, J Ballam, J James, H S Power.

DUNDEE.—Chairman: F Turton, Glencoe Junction. Members: J Campbell, J J Grove, H Wiltshire, G M De Waal, Aug Jansen, A J Potgieter, A Cronje, A Schuid, H Greenhough. **SUB-DIVISIONAL BOARDS.**—*Glencoe Sub-area.*—Members: F Turton, H Greenhough, W H Miller, F Schroeder, V Marshall, J Lausen, J J De Jager, Rev Father Rauch (Native interests). *Halting Spruit Sub-area.*—Members: J J Grove, H A J Davil, A E Norman, J Campbell, Rev J Dewar (Native interests). *East of Helpmakaar Road.*—Members: A M Cronji, D C Pieters, P Meyer, J A Naude, A Jansen. *West of Helpmakaar Road.*—Members: A J G Meyer, A P Lund, D C Uys, A J Van Tonder, Jun, A J Potgieter. Members of Joint Committee for Area West of Helpmakaar: A J Potgieter, A P Lund. Members of Joint Committee for Area East of Helpmakaar: A Jansen, A M Cronji. *Area between Main Vryheid Railway Lines.*—Members, W Craig, H Wiltshire, C M Meyer, Sen, A Spies, Jun, C M De Waal.

DURBAN BOROUGH.—Chairman: E L Acutt, Durban. Members: H R Bousfield, R Benningfield, G Swales, J Haynes, — Arthur.

EMTONJANENI.—Chairman: Magistrate. Members: F W Smith, H J James, F W White, A W Symmonds, R J Ortlepp, D C Uys, L J Van Rooyen.

ESHOWE.—Chairman: A Boast, Magistrate. Members: A Moore, G H Hulett, C F Adams, T Parkins, A T Wantink, F J Dickens, H H Thole.

ESTCOURT.—Ward 2. *East of Main Line.*—Chairman: A Stuart. Members: Magistrate, J Ralfe, J W Haw, J G Hatting, A Peniston, A B Haviland, C M Rudolph. Ward No. 3. (Boundaries): The Bergville Magisterial Division, Tugela

to junction of the two Tugelas; The Winterton Settlement fence to Vaai Plaats fence and Ovington and Sibhamie's Location fence, and from there to Government Game Reserve).—Chairman: H J De Waal, Glenisla. Members: R Gray, M Sanderson, R J Land, A Spearman, H L Bacon. *Ward No. 4* (Estcourt West of Railway Line; follow Bushman's River as far as Mr. Kerr's farm, then Nalaara's Location fence as far as Game Reserve).—Chairman: R H Ralfe. Members: F C Schiever, J Rencken, W Couch, P Male, T L Fyvie, J Hatting, A W J Hatting. *Ward No. 5* (Boundaries: Remainder of District West of Line).—Chairman: H Blaker, Estcourt. Members: W Comins, E B Griffin, H A Woodruffe, Col. Crompton, J Russell, A C Robinson, Jun, A E Downing, A D Shaw, J W Bentley.

GREYTOWN.—Chairman: Paul Hansmeyer, Greytown. Members: D Havemann, A Newmarch, J A Nel, W T Slatter, A T Handley, H S Botha. *Central Board*.—Chairman: P Hansmeyer, Greytown. Members: J A Nel, A Newmarch, W J S Newmarch, T K Taylor, S W Cadle, R J Van Rooyen, E J Van Rooyen, J G Nel.

INANDA.—Chairman: C R Bishop, J.P., Umgeni. Members: R Harrison, W Sykes, Jun, E Dore, W Campbell, R Armstrong.

KLIP RIVER.—*No. 1* (A line from Elands Laagte along the Matawaans and Jononos Kop to the Berg; North line, Dundee boundary: all West of Main Line).—Members: C Mitchell Innes, R M Gray, L Meyer, J C Henderson, C Allen. *No. 2* (O.R.C. line and boundary No. 1). Members: D Bester, A J Marais, W Allison, J Bester, — Brink. *No. 3* (From Klip River Bridge to Sand Spruit, and up Sand Spruit to its source in the Berg).—Members: H A Potgieter, A A Wetherell, B Nel, F Van Rooyen, H Portsmouth. *No. 4* (Rest of Division South and East of Sand Spruit and West of Main Line).—Members: W Leatherin, H Illing, J H Newton, E Robinson, G W Willis. *No. 6* (Whole of Division East of Main Line).—Chairman: J G de Waal. Members: R A Smith, H Nicholson, P Cronje, J Farquhar.

KRANTZKOP.—Chairman: L L D Proksch, Krantzkop. Members: L M J Van Rooyen, L M J Van Rooyen, F E Van Rooyen, J H Van Rooyen, J P Zietsman, A Johnson.

IXOPO.—Chairman: Magistrate. Members: Thos Allen, Geo Martin, E Marriott, A Stone, G A Cooper, J.P., Wm Gray, D Campbell, F L Thring, J.P.

LION'S RIVER.—*No. 1* (Southern portion of West of Main Line).—Chairman: U K McKenzie, Lidgetton. Members: R J Spiers, F North, A McLean, J Morphew. *No. 2* (Northern portion West of Main Line).—Chairman: G Ross, Nottingham Road. Members: J Clouston, K Soutar, D Connel, D Smythe. *No. 3* (Southern portion East of Main Line).—J W Dicks, "Rosebank," Howick. Members: W M Henderson, — Buchanan, Jos Raw, H J McKenzie. *No. 4* (Northern portion East of Main Line).—Chairman: H Burgmann. Members: W Methley, G Hutchinson, J J Morton, B Taylor. (The whole of the members of the Sub-Divisional Boards constitute the Central Board with the Magistrate, Lion's River, as Chairman.)

IMPENDHLE.—Chairman: T Fleming, Boston. Members: J Martens, P J Lourens, T Carter, C W Brooke, J W McLean, H Boike, C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell. *Sub-Committee appointed for Northern portion of Division* (added to Lion's River Division).—Chairman: P J Lourens, Insinga, via Nottingham Road. Members: H Boek, C N Brooke, T Carter, J Martens, J W McLean. *Sub-Committee for Southern portion of Impendhle*.—Chairman: T Fleming, Boston. Members: C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell.

LOWER TUGELA.—Members: W H B Addison, A E Jackson, H E Essery, A S L Hulett, J Brown, W O Robbins.

LOWER UMZIMKULU.—Chairman: Col. J F Rethman, North Shepstone. Members: Col. J R Royston, D C Aitken, J.P., C H Mitchell, J.P., G P Beachcroft, Claude Manning, H Albers, N Harper, J S Clarke, A Borchard, T Stapleton, Col. Bru-de-Wold.

MOOI RIVER.—Chairman: W. G. Randles. Members: J. H. Wallace, H. F. Cadle, R. Garland, John Bartholomew, J. W. Johnstone, C. R. Skottowe, J. N. Boshoff, J. R. Lindsay.

MTUNZINI.—Chairman: Magistrate. Members: F Green, G M J Gielink, G Getkate, W Saville, A H Konigkramer.

NEWCASTLE.—*No. 1* (to be known as Charlestown-Ingogo District from main line of Railway where it strikes the Southern line of the farm Cloutant West, thence along Western boundary of said farm, thence along S. W. boundary of Tipperary West, thence Southern boundaries of Hamstead, Dumferline and Roodeport, thence along the Northern side of the Botha's Pass main road to where it joins the O.R.C. Boundary, thence along the boundary of the Colony, thence along the Charlestown Fence to where it joins the Railway line near Mount Prospect Gate, thence along the Railway line to Cloutant West).—Chairman: J Vos, Charlestown F.O. Members: W J Adendorff, A J Johnstone, A Paine, A H Trouw, Angus Wood. *No. 2* (Newcastle district Southern boundary of No. 1 along Railway line from Cloutant West, including portion of Town Lands, Newcastle, which by agreement with Government is considered to be West of line, thence along Railway line where it strikes the Southern boundary of the farm Kopjeallen, thence along Southern boundaries of Kopjeallen, The Gardens, and Lincoln to the Ingagane River, thence up the Ingagane up to the farm Falixtowe, along Southern boundaries of Falixtown, B. Iwerton, Brooklyn, Stonehenge, Tathamscamp, Hanover, Ellensdale, Endsel, Bejuisel, Stelazies Kop, Mount Blanc, to O.R.C. border fence, thence along O.R.C. boundary joining Southern boundary of No. 1 at Botha's Pass).—Chairman: S W Reynolds. Members: F A R Johnstone, W Moller, J.P., L H S Jones, C Earl, F Meyer, J J Muller, — Van Breda, J Macdonald, J C Adendorff, E Sanders. *No. 3. Dannhauser District* (Bounded by Southern District No. 2 from the Railway line at Kopjeallen to the Berg, thence along O.R.C. border, the boundary between Newcastle and Klip River Divisions, thence along the Railway line to the farm Kopjeallen).—Chairman: W L Oldacre, Dannhauser. Members: Geo Friend, B Harrington, L J Muller, J Ecksteen, E Hodson, W Watson, Ted Twyman, G Langley, Don Urquhart. *No. 4* (East of Railway Line, along the boundary between Newcastle and Dundee Divisions from the Railway Line near Dannhauser to the Buffalo River, along the Buffalo River to the junction of the Ingagane, thence along the Ingagane to its junction with the Ineander, thence along the Ineander to the fence of the Newcastle Town Lands, known as the Eastern boundary of the Railway Line, thence along the Eastern side of the Railway Line to the Magisterial Division boundary near Dannhauser).—Chairman: T K Boshoff, Dannhauser. Members: J H Potgieter, H Miller, J H van der Westerhuizen, J J Kemp, W Dicks, C Uys. *No. 5* (the strip of land lying between the Railway Line and the Buffalo River from the Ingagane and Ineander streams, which form the North-Western boundary of No. 4 district).—Chairman: E W. Noyce, Boscobello P.O.; members, Geo Matthews, T K Panzera. *Central Board.*—Chairman: S W Reynolds, Newcastle. Members: F A R Johnstone, J Vos, Sen, Angus Wood, W Oldacre, W Watson, E W Noyce, F N Panzera, T R Boshoff, J H van der Westhuizen.

NEW HANOVER.—Central Board. Chairman: E Newmarch. Members: W W Bentley, T C Wolhuter, F Reiche, H Schmidt, E Lindhorst, W L'Estrange, A F McKenzie, W Meyer. *New Hanover Sub-Committee.*—Chairman: E Newmarch. Members: Jno Moe, W W Bentley, W Ortmann, T C Wolhuter, O J Muirhead. *Dalton Sub-Committee.*—Chairman: W L'Estrange. Members: A F McKenzie, R W Smith, G Reddinger, H Rosenbrock, J H Gordon, W Meyer. *Schroeders Sub-Committee.*—Chairman: F Reiche. Members: H Schmidt, E Lindhorst, G Moe, P Rodehorst, H T Rohrs, F Gorden, A Meyer, W Fortmann.

NQUTU.—Chairman: A Barklie, Utrecht. Members: H Wilkins, R L Flindt, W A Westbrook, J W F Hall, Dr. Knight.

PAULPIETERSBURG.—Chairman: N J Els, Viljoen's Rust. Members: J B Rudolph, G J Combrink, A Schutte, A Bester, P H van Rooyen.

PIETERMARITZBURG.—Chairman: B Swete Kelly, Pietermaritzburg. Members: W S Crart, C A Fawcett, W E Goodwin, E G McAlister, E E Hodgson.

RICHMOND.—Chairman: Magistrate. Members: E E Johnson, J Mapstone, G D Alexander, C P Lewis, C Nicholson, W Comrie, John Marwick, W P Payn, A H Cockburn. *Sub-Division No. 2.*—Chairman: G D Alexander, Nel's Rust. *Sub-Division No. 5.*—Chairman: W Oldfield, Fox Hill.

REIT VLEI DISTRICT.—Chairman: D. E. Muir, J.P., Elsmore, Mooi River. Members: P. Otto, J.P., R. J. Van Rooyen, E. J. Van Rooyen, J. G. Nel, A. Kohrs, J. Hooper, Otto Norton (Hon. Secretary).

SEVEN OAKS DISTRICT.—Chairman: W J S Newmarch, Harden Heights. Members: H M Balding, J.P., J Crow, J T Martens, H Mayne, S W Cadle.

UMGENI DIVISION.—Chairman: E. S. Goodwill. Members: F. Schroenn, B. Crompton, C. Arnold, R. J. Potts, A. J. Tyler, F. J. Smith, A. Wood, J. P. Symonds, J. J. Potterill, W. H. Keytel, C. Lund.

UMLAZI.—Chairman: C Henwood, Durban. Members: W Pearcer, W Gillett, H Freese, L Jackson, P W Mackenzie.

UMSINGA.—No. 1 District (All farms lying West of the Umsinga-Helpmakaar main road).—Chairman: E C Nuss. Members: W W Strydon, J.P., J H Nuss. No. 2 District—(All farmers East of the Umsinga-Helpmakaar main road—excepting the farms Sutherland, Gordon, Memorial Mission and Pomeroy Town Lands, and Location lying North of the Mazabeko and West of the Buffalo River.—Chairman: W H Wholberg, P.O. Elandsdraal. Members: H W Dedekind, J Dedekind. No. 3 District—(The remaining portion of the area lying in the Umsinga Division).—Chairman: A Muller. Members: M J Matheson, H Muller. The three Committees to constitute the joint Committee.

VRYHEID.—Chairman: A von Levetzow, Vryheid. Members: P Labuschagne, B E A Rahe, G M van der Westhuizen, J Kruger, J F Potgieter, L M N Nel.

WEENEN.—Chairman: C G Jackson, Weenen. Members: C Harding, J.P., P J van Rooyen, J.P., K Rotteher, S B Buys, J J Vermaak, L C Kinsman, J W A Pole, C F Vermaak, P R Buys, J C's son.

Publications Issued by the Department of Agriculture.

THE following publications, issued by the Department of Agriculture, are still in print, and copies may be obtained free (except those with price attached) upon application to the office of the *Agricultural Journal*, Department of Agriculture, Pietermaritzburg. The figures in square brackets (e.g. [1904]) are the years in which the various publications were issued.

No.

BULLETINS.

- 2.—“Manures on the Natal Market, 1902,” by Alex. Pardy, F.C.S., Analyst. [1902.]
- 4.—“Manures on the Natal Market, 1903,” by Alex. Pardy, F.C.S., Analyst. [1903.]
- 6.—“Manures on the Natal Market, 1904,” by Alex. Pardy, F.C.S., Analyst. [1904.]
- 7.—“Tree-planting in Natal,” by T. R. Sim, F.L.S., Conservator of Forests. [1905.]
(Price 2s. 6d., post free.)
- 8.—“Agricultural Co-operation,” by E. T. Mullens, Secretary, Minister of Agriculture. [1905.]
- 10.—“Manures on the Natal Market, 1905,” by Alex. Pardy, F.C.S., Analyst. [1905.]
- 11.—“East Coast Fever,” by S. B. Woollatt, Principal Veterinary Surgeon. [1906.]
- 12.—“Manures on the Natal Market, 1906,” by Alex. Pardy, F.C.S., Analyst. [1906.]
- 13.—“Report on the Disease known as ‘Bluetongue’ in Sheep,” by H. Watkins-Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1908]
- 14.—“Poultry-Keeping in a Simplified Edition for Farmers,” by F.C. [1908.]
- 15.—“Some Common Bagworms and Basketworms,” by Claude Fuller. [1909.]

REPORTS.

Annual Report of the Agricultural Department, 1902. (Includes Reports of the Director of Agriculture, Entomologist, Conservator of Forests, Dairy Expert, Editor *Agricultural Journal*, etc.) [1903.]

Report of the Secretary, Minister of Agriculture: January 1, 1903, to June 30, 1904. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1905. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1906. [1906.]

(For a continuation of the statistics given in these reports see reprint "Natal's Progress in 1906," noted below.)

Fourth Report of the Government Entomologist: 1903-4. [1905.]

Fifth Report of the Government Entomologist: 1904-5. [1906.]

Sixth Report of the Government Entomologist: 1905-6. [1907.]

(The Third Report of the Entomologist is included in the "Report of the Agricultural Department, 1902," noted above.)

Report of the Conservator of Forests, 1902. [1903.]

Interim Report of the Conservator of Forests up to December 31, 1905.

Report of the Principal Veterinary Surgeon, for year ended 30th June, 1906. [1907.]

First Annual Report of the Land Board, 1905. [1906.]

Annual Report of the Land Board, 1906-7.

MISCELLANEOUS REPRINTS, ETC.

Black Spot ("Letter Book Pages": reprinted from *Journal*.)

Mealie Grubs (do do)

Mosquitoes (do do)

Woolly Aphis (do do)

Cotton. By A. N. Pearson, Director, A. E. & C. (Reprinted from *Journal*: 1904.)

Co-operation. By E. T. Mullens, Secretary, Minister of Agriculture. (Reprinted from *Journal*: 1907.)

Citrus Fruit Export. (Reprinted from *Journal*: 1907.)

Natal's Progress in 1906. (Reprinted from *Journal*: 1907.) The statistics contained in this paper are on the same lines as those in the Annual Reports for previous years of the Secretary, Minister of Agriculture.

Natal's Progress in 1907. By H. J. Choles, F.S.S. (Reprinted from *Journal*: 1908.)

Fibre Cultivation. (Reprinted from *Journal*: 1907.) This paper is a summary of Bulletin No. 13 of the Department of the Interior, Bureau of Agriculture, Manila.

Sisal, Mauritius Hemp and other "Aloe" Fibres. By T. R. Sim, F.L.S., Conservator of Forests. (Reprinted from *Journal*: 1907.)

The Fibre Industry of Mauritius. By Leonard Acutt, J.P., Tongaat; Member of the Land Board, Natal. (Reprinted from *Journal*: 1907.)

South African Products Exhibition, 1907. Report of T. R. Sim on the Natal Exhibits. (Reprinted from *Journal*: 1907.)

Poplar Timber for the Local Manufacture of Matches. By E. R. Sawyer, Director, E.S. (Reprinted from *Journal*: 1908.)

Agricultural Industries and Land Settlement in Natal. [1907.]

Judging Fruit, Flowers, Plants and Vegetables at Shows. By T. R. Sim, F.L.S., Conservator of Forests. [1906.]

Agricultural Statistics, Natal, 1905-6. [1907.]

Model Rules for Agricultural Co-operative Societies. (Price 1s., post free.)

Government Laboratory.

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Blue Tongue Vaccine, per 25 doses ...	2	0
Blue-Tongue Curative Serum, per 50 cub. c. ...	2	6
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